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The Selective Trainer–Trainee Scheme of the International Development Research Centre

Pedro V. Flores

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THE SELECTIVE TRAINER-TRAINEE SCHEME

OF THE

INTERNATIONAL DEVELOPMENT RESEARCH CENTRE

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PREFACE

The mission of the Fellowships and Awards Division (FAD) of the International Development Research Centre is to assist research institutions of the developing regions of the world to create a capacity for high quality research and to assist the development of training institutions to where they can meet their own research-related training needs. This evaluation study addresses both components of the Division's mission statement through a follow-up on the research capacity that was developed at the trainee level, as well as through an examination of the overall enhancement of the trainer institutions.

The trainer institutions assessed in this study represent only three of several that play an increasingly important role in the generation and delivery of knowledge to students from developing countries of the region. In addition, the development of the various training programs described in this study, as well as the funding of trainees from the region to participate in them, has contributed to the sustainability of the trainer institutions, as well as to the enhancement of their status as institutions with a truly regional mandate. Indeed, it is hoped that past and future investments in such institutions will allow them to diminish their reliance on institutions of the North, particularly in relation to fisheries-related training. It is also hoped that the young scientists who have benefitted from this training will in turn contribute to the development and enhancement of their respective research institutions.

This study is of particular relevance to FAD in that it represents a retrospective examination of a 1982 initiative that has served in part as a model for other similar approaches utilized by the Division in other regions of the developing world. The lessons learned from this study should better inform future capacity building initiatives elsewhere.

Finally, I wish to pay particular tribute to Dr. Brian Davy and to Dr. Pedro Flores, the architects of the "Trainer-Trainee Scheme." Their commitment to the strengthening of research capacity through encouragement and investments in regional institutions has played a very important role in the Centre's current approach to institution development and capacity building.

G. R. Bourrier
Director
Fellowships and Awards Division

FOREWORD

The IDRC Fisheries Program

The AFNS Fisheries Program, in conjunction with the various national fisheries programs in Asia has been attempting to develop a comprehensive approach to research support on critical fisheries problems common to many countries in the region. This has resulted in a broad coverage of research topics under the two major subsectors of (a) aquaculture/mariculture and (b) artisanal fisheries. Both topics are of clear importance to small farmers and fishermen in Asia and therefore a priority for possible IDRC support. In more recent years, most of this support has been increasingly focussed under a variety of Asian fisheries research networks:

(1) Asian Fisheries Social Science Research Network;
(2) Network of Aquaculture Genetics in Asia;
(3) Asian Fish Health Network;
(4) Asian Fish Nutrition Network.

One advantage of the networking approach is that it will enable more focussed support for the needed training initiatives related to the above research programs.

It goes without saying that the development of the human research resource is the main factor in achieving IDRC goals. Well-trained scientists are needed to do quality research.

We are very pleased to have collaborated in this review as well as the ongoing training program partnership that is examined in this document. The identification of trainees related to IDRC projects and the selection of appropriate training locations is a very time-consuming and difficult task. We have learned a great deal from our experiences in arranging the training to date. Perhaps the main lesson was just how time-consuming is the development

of large numbers of specialized training programs for a wide variety of individual needs. This review is therefore very timely in attempting to draw out of this experience a variety of general conclusions that may benefit other regions and disciplines. This review focusses on the FAD support for selected trainees and training institutions in Asia. This is only a sample of FAD support for AFNS-Fisheries. Further, the fisheries program also utilizes a variety of training funding mechanisms through in-project training under AFNS-Fisheries program research projects. This not only allows a very flexible approach to training but also requires a high degree of dialogue and cooperation between FAD and fisheries program staff. This has worked well to date.

Finally, this report is one in a series of joint initiatives to critically review and hopefully improve the training options related to the AFNS-Fisheries program. Other related studies include:

(1) Chua, Thia-Eng. 1987. Aquaculture training needs in developing Asia. IDRC-MR-145e. 35 p.

(2) Asian Fisheries Society. 1988. Fisheries education and training Asia: workshop proceedings. Asian Fish. Soc. Spec. publ. 2. 162 p. Asian Fisheries Society, Manila, Philippines.

(3) Davy, F.B. 1988. Research for aquaculture development in the Third World: the IDRC approach. Paper to be presented at Aquaculture '88, Vancouver, B.C., 6-9 September 1988.

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CHAPTER I

INTRODUCTION

Background

The role of the Fellowship and Awards Division (FAD) of the International Development Research Centre (IDRC) is to assist in the training and upgrading of individual developing country researchers and managers in scientific fields related to the mandate of IDRC. Through training, the division aims to help build research capability of research institutions in Third World countries.

Since 1982, FAD's program in Asia has been carrying out this objective through the Selective Trainer-Trainee Scheme (T-T scheme). This scheme resulted from a comprehensive review of FAD's program in Asia prior to 1982. The review found that FAD's (then called the Fellowship Program) training support was mainly in the form of individual awards (127 in total), widely scattered among 13 countries and 97 institutions. As a result, it was decided to develop a more focused program whose goal was to encourage and develop the capability to train scientists in institutions within the region, and thus respond to the needs of research institutions for trained staff in specified fields.

This review focuses on the FAD support for selected "trainer" and "trainee" institutions in Asia. More specifically, this review covers FAD's support to IDRC's Agriculture, Food and Nutrition Sciences division fisheries program (AFNS/FI). AFNS/FI also funds training within its research projects. This allows a flexible approach to training but it also requires a high degree of dialogue and cooperation between FAD and AFNS/FI staff. To date, this difficult task has worked well. We have learned how time consuming (especially in the initial stages) the development of large numbers of specialized training programs is for a wide variety of individual needs. This

review is, therefore, very timely in attempting to draw out of this experience a variety of general conclusions that may benefit other regions and disciplines, especially under the current IDRC trend to promote multi-divisional collaboration and integrated, coherent approaches.

FAD-AFNS/FI Collaboration

Under the T-T scheme, FAD in Asia provided substantial support to AFNS/FI's program because AFNS/FI has had a strong and stable research program that fits well with the focused objective of the FAD scheme. For example, AFNS/FI, in conjunction with the various national fisheries programs in Asia, has been attempting to develop a comprehensive approach to research support on critical fisheries problems common to many countries in the region. This has resulted in a broad coverage of research topics under the two major subsectors of (a) aquaculture/mariculture and (b) artisanal fisheries. Both topics are important to small farmers and fishermen of Asia and therefore a priority for possible IDRC support. In recent years, most of this support has been increasingly concentrated under a variety of Asian fisheries research networks. One advantage of the networking approach is that it will enable more selective support for the required training related to the research needs of these networks.

In addition, fisheries, relative to other programs of IDRC interest, had been identified as having major needs for increased training inputs (Chua 1987). IDRC wanted to encourage the development of quality training options within the region to meet this expressed need by the various fisheries national programs.

Of the participants trained by RLCC, UPM, and SEAFDEC-AQD, 59% (85 of 145) came from institutions with AFNS/FI project support. In terms of the objective of the T-T scheme to link FAD support directly with AFNS-supported institutions, the 59% match may not be a great success. However, it should be remembered that most of the training courses were short term and they involved the dissemination or transfer of scientific technology. Thus, the interest of government agencies and even that of the private sector to avail itself of

the technology should be recognized. A similar recognition should be accorded to non-IDRC-related research institutions interested in verifying or in the further investigation of the technology. Such institutions may become future IDRC project recipients, and trainees were chosen with this in mind.

Unfortunately, it was not always possible to synchronize exactly the training with an AFNS/FI project to follow. For example, a trainee might have performed poorly in the training course and therefore the planned project may have been delayed or not started. The poor performance of a traineee in a training course can be traced back to the manpower constraints of the trainee institution, primarily lack of well-qualified candidates. National government clearance may have been delayed or not given as expected for the research project; funding (either IDRC or national government counterpart) may have not been available in the amount or timing initially hoped for. In general, a higher percentage matching rate requires major staff time from IDRC recipients for synchronization.

In the two degree training programs (M.Aq. and M.Sc., Fisheries Economics), a high percentage of the trainees were from AFNS-supported research centres. For example, all the M.Sc.s were from the AFSSRN members, which have been funded by the Social Sciences division, AFNS/Agricultural Economics Program, and AFNS/FI since 1983. In the M.Aq., 72% (13 out of 18) were from AFNS/FI related institutions.

Selective Trainer-Trainee Scheme (T-T scheme)

The main objective of the T-T scheme is to help develop strong training and research institutions in specified areas of research in the Asian region. These institutions are existing national or regional universities or specialized research/training centres. It is believed that the training (degree and/or non-degree) offered within the region can provide cost-effective experiences relevant to the needs of researchers or scientists of national agencies.

An institution offering training is referred to as a "trainer," and an institution that sends participants to the training program is called a "trainee." The identification of the trainer and trainee institutions is a collaborative effort of FAD and the various divisions of IDRC and the national programs of the countries involved. A trainer is usually an established institution with an on-going training course or courses, degree or non-degree (short-term). Trainee institutions are those where IDRC has existing research project support or those who are potential recipients of future IDRC support. Major government agencies engaged in research or development activities may also qualify as sources of trainees. The training or research programs of the trainer or trainee institutions can be in any of the disciplines or problem areas specified by an IDRC division or program. The number of trainer institutions FAD can support depends on the importance an IDRC division or program gives to training to enhance research. This importance varies from division to division, from program to program.

There are three main criteria in the selection of a trainer institution. One is adequate infrastructure, such as lecture rooms, equipped laboratories, a library, dormitory, and recreational facilities. Another criterion is manpower expertise, including sufficient numbers of qualified lecturers and support staff. The third criterion is the existence of a relevant program -- a training course within IDRC's mandated areas of concern and relevant to the needs of the scientists in developing countries.

Objectives of the Study

This review documents cases to show how the T-T scheme was applied and how it worked in IDRC's AFNS/FI program. The study concentrates on three trainer institutions and a few of their trainee clients. These trainer institutions were: the Southeast Asian Fisheries Development Center--Aquaculture Department (SEAFDEC-AQD), Tigbauan, Iloilo, the Philippines; Universiti Pertanian Malaysia (UPM), Serdang, Malaysia; and the Regional Lead Center of China (RLCC), Wuxi, China. Over a 5-year period, FAD sent at least 140 staff members from 34 institutions in Asia to these three trainer

institutions, excluding some technicians from private fish farms who took two SEAFDEC-ADQ short-term courses.

The documentation of the three trainer cases is expected to provide some future policy direction to the FAD program. More specifically, this document aims:

(1) to review, quantitatively and qualitatively, the processes involved in trying to apply the T-T scheme;

(2) to provide descriptive, research-based data for the purpose of clarifying how the scheme worked in practice -- its strengths; problems; constraints and/or critical elements; who benefited, why and how.

(3) to draw implications for FAD's training policies and strategies.

Methodology

Logical Framework

The method used in implementing this case study is described in the following logical framework:

Aspects to be Reviewed	Indicators	Methods of Verification	Sources of Information
History of T-T scheme	Key events/development directly related to objectives and program direc-	Extract pertinent information relevant to T-T scheme.	Centre studies/ reports on training policy, reports of P. Flores.

	tion of FAD.		
Application of T-T scheme in trainer-trainee institutions	Information about trainer institutions; consultations, negotiations with program officers and clientele institutions	Review capability of trainer institutions in research and training; review process of negotiations and agreements with trainer institutions; consultation process with program officers.	Institutional catalogues/ brochures; trip reports; P.S./MGC*; interviews of institutional officers of trainer institutions; interviews of IDRC program officers.
Benefits gained by trainer and trainee institutions	Trained staff to strengthen capability of trainer institutions; types of knowledge/ skills gained by trainees and how these were applied in home institutions.	Provide questionnaires and interview trainees, institution officials, and IDRC program officers.	Questionnaires and interviews.
Implications for FAD's training policies and strategies	Data gathered and analyzed from questionnaires and interviews.	Summarize major findings; draw implications.	Write up of data and analysis.

*Project summary/Memorandum of Grant Conditions.

Process

For the background and history of the T-T scheme, earlier FAD reports were reviewed along with IDRC studies and reports on training policy. Information about the trainer institutions and their ability to offer training programs was extracted from trip reports. This documentary review emphasizes the processes that were followed in the identification and decisions to encourage and develop the three trainer instutions covered in the case study.

A questionnaire (see Appendix A) was sent to 145 trainees involved in the training programs of the three trainer institutions. The questionnaire focused on getting information about what knowledge and skills were learned during the training and how the knowledge and skills learned were applied upon return to the home institution. For example, did the training change their ability to work in their home institution? What specific knowledge and skills from training were they able to apply at home? Does the institution acknowledge the value of training through a reward or incentive system?

A follow-up personal interview was conducted with the officials of the trainer institutions and a sample of the trainees. Interviews were done at RLCC, China; SEAFDEC-AQD, the Philippines; and UPM, Malaysia.

The Sample

The selected respondents had participated in two degree courses, the Master of Aquaculture (M.Aq.) and the Master of Science (M.Sc.) in Fisheries Economics, and six short-term courses offered by the three trainer institutions. Of the 145, 57 (39%) returned responses. Almost all of the respondents' narrative account has been covered in this report (see Appendix B).

FAD HISTORY AND IDRC'S TRAINING POLICY

The Fellowships and Awards (FAD) division of IDRC became a division on 1 October 1983. Before this, it had been the Human Resources Unit and later the Fellowship Program (1 April 1980), until it was elevated to division status.

Despite the existence of the Fellowship Program (FP) most program divisions continued to support their own in-project training or training projects to address their perceived lack of trained researchers or lack of opportunities to train researchers in developing countries. The issue of IDRC's support for training and the mechanisms used became the subject of debate within IDRC, prompting the Office of Planning and Evaluation (OPE) to do a Training Policy Study (TPS) in February 1981.

Some of the recommendations of the 1981 TPS were:

1. To allow two approaches to IDRC training: for program divisions to include support for training in their research projects; and for FP to emphasize awards that would complement program priorities of IDRC.
2. To take a longer term perspective of training projects in areas of critical shortage within IDRC's program areas.

3. To focus future training support on the least-developed countries.

4. To give preference to a master's program rather than to Ph.D training; encourage more short-term and informal training in local institutions in specific disciplines; encourage supervised on-the-job training because of the important research skills derived through this method; look

into the potential of IDRC staff or consultants who are visiting projects acting as trainers.

5. To entertain requests of project teams for training in data collection and analysis, laboratory techniques to improve skills of junior researchers; and short courses to teach research management skills in selected developing country institutions.

6. To give priority to placing trainees in training institutions in their own country or elsewhere in the Third World. Where no appropriate local or other Third World facilities exist, an appropriate Canadian institution should be identified and explored before sending trainees to other industrialized countries.

In Asia, FAD's response to the Centre's TPS recommendations was a study of the FAD program from 1976 to 1982. The study concluded that FAD's program in Asia was heavily focused on individual awards. A total of 127 individual awards were given out during this period of 6 years spread over 14 countries and 97 institutions. Seventy percent of the awardees went for various types of non-degree training, while the rest (30%) went for master (20) and doctoral (18) degrees.

As a result of the study and to give substance to the recommendations of the 1981 TPS, a concept paper on the T-T scheme was developed for reaction by program officers in ASRO, the Singapore IDRC regional office, and by two consultative groups. The scheme gained acceptance, and implementation was started. Under the scheme, the categories of awards (e.g., pre-project, post-project, program related) were retained but gradually focused on selected trainee institutions. A deliberate move was made to send awardees to trainer institutions in the region.

After it became a division in 1983, FAD adjusted its program organization and resource distribution to reflect the greater commitment of IDRC in training as a distinct activity. This marked the first stage of FAD's strategic planning. Under this strategy, FAD's program was broadly categorized into a program for developing countries and a program for Canadians. Special programs were also retained. New activities called "institutional development" and "new initiatives" were added to give substance to the TPS recommendation to strengthen training capacity of developing country institutions and to experiment on other research- related training approaches.

These two new activities were a boost to the T-T scheme as a new initiative for institutional development. The scheme became the cornerstone of FAD's program in Asia.

The second stage of FAD's strategic planning came with the realization that it had to balance its support function and professional function. The support function had to take into account the shifting priorities and approaches originating in the program divisions. For example, the need to assist project or program development, and to sustain institutions considered key for research and training within a region; the need to recognize the importance of training needs of one unit over another within a single division; and the need to balance FAD's financial and administrative support for individual awards and its support for training projects. To complement its support function with a professional function, FAD had to consider its staff's role in advising training courses' design; planning and design of curriculum; teaching methods and material preparation; integrating training and research within institutions; supporting research on training. All these were taken into account as possible activities within the T-T scheme.

After almost four years of existence as a division, the IDRC Board of Governors thought it was time to review FAD's past performance and future plans. In its January 1987 report, the review panel concluded that it "was strongly supportive of the work of the division" finding that "its contribution to the work of the Centre has grown in importance since its

inception." The Board Review identified a number of strengths of the FAD program: "effective decentralized planning and budgeting, high quality of its professional staff, strategic emphasis of its past performance and future plans, and the creativity in planning and conducting training activities." At the same time, the panel also made several recommendations, the most important of which for this study were: more attention to the training process; greater allocation to human resource development research; larger scale and detailed tracer studies of former award holders; development of consistent evaluation instruments; a deliberate promotion through training of dissemination and implementation of research results; a more prominent role and increased responsibility for training in IDRC; and a revision of the training policy and strategy to reflect the modified role of FAD and the consequent shifts of program division responsibilities in training.

As part of the review exercise, FAD produced a program statement in which it outlined its future program activities and mechanisms. This refined program was partly developed from years of FAD experience worldwide, including the T-T scheme in Asia. The present framework under which FAD operates may be considered the third stage in the division's evolution. The gist of this framework is as follows:

Program	Mechanisms
1. Project Development--reserved for weaker" sectors (fields); support provided through individual projects.	1. Project Related Awards (pre and post project); Group Training (workshops in preparation for anticipated project); Third Party to train for better research within a project.
2. Program Development-- established sectors (fields) at established institutions.	2. Program Related Awards - for formal and informal training; Group Training; Third Party.

3. Institutional Development-- to develop and strengthen trainer institutions where research and training come together.	3. Group Training; Third Party.
4. Specialized Training-- programs outside Centre's Program Divisions' interest (e.g. Pearson) or training that cuts across interest of all Program Divisions (e.g., microcomputers).	4. Group Training; Third Party; Individual Awards.

Although three adjustments have been made in FAD's program since its existence as a division, the T-T scheme remained the strategy in Asia in the implementation of the various components and mechanisms of its program.

CHAPTER II

FINDINGS AND ANALYSIS

Viewed from its various aspects, the efficacy of FAD's T-T scheme is supported by the data generated by this study. As a centerpiece of FAD's strategy in Asia, and from the standpoint of IDRC training policy, the success of 3-4 years' implementation in the fisheries sector of AFNS can be seen in the results. These results may have less impact in the trainee institutions as a whole, but the positive experiences testify to the effectiveness of the various training courses among the trainees as individuals.

For the trainer component of the scheme to make its institution-building impact on the trainee institutions, the scheme has to exist for at least 10 years, during which time selected national trainee institutions should be identified for intensive training support of their staff.

The number of trainee institutions served by the three trainers was still too widely distributed to be called selective. A larger portion of FAD's training resources went to expenses of trainees than to the trainers' physical facilities or staff development. This is a desirable allocation of resources from FAD's standpoint.

Match. Of the 145 trainees funded by FAD in the training programs of RLCC, UPM, and SEAFDEC-AQD, 58% (85 out of 145) were from AFNS-supported research institutions. Seven of these training programs are short term and two (M.Aq. and M.Sc. Fisheries Economics) are degree courses. Although it cannot be claimed that each participant within the FAD-AFNS matched group was directly involved in an AFNS-supported project, the data indicate an almost one-to-one association between the topics of FAD training and the subject of AFNS-funded research. A good match can be enhanced further if AFNS/FI links

with trainee institutions through project support. Such followup by AFNS/FI of these institutions and trainees will illustrate very well the effectiveness of interdivisional collaboration as well as the merit of the T-T scheme. Of course, an equally encouraging indicator of effectiveness is the institution's own utilization of the trainees' training in the research projects funded by their own or other sources.

The 58% institutional match and topic correlation illustrate the extent and quality of focus that the T-T scheme had been striving to achieve. However, most of the training courses deal with technologies developed from research. Thus, the need to learn of these technologies by personnel other than researchers (e.g., government development workers and private fish farmers) should be recognized. The reality of this situation demonstrates the need to view IDRC's research mandate and responsibility more broadly -- from problem identification to dissemination. The acceptance of this expanded interpretation will have implications in the objectives and funding strategy of at least three divisions of the Centre -- FAD, Communications, and Information Sciences. These three divisions will need to assess their role in the dissemination/application process and the priority to be given to this process in their funding strategy.

Long-Term Perspective. Except for two short-term courses (Fisheries Economics for Non-Economists and Aquaculture for Economists), the rest of the programs of the three trainer institutions had FAD support for 3-4 years. This longer term view of the T-T scheme fits well with the policy recommendation of the 1981 TPS, which stated that IDRC should "take a longer term perspective of training projects in areas of critical shortage within the Centre's program areas." "Long-term" relates to FAD's program category "institutional development" as compared to its other mechanisms that provide one-time or year-to-year grants (e.g., "group training" or "program/project related awards). Support for trainer institutions should be longer than 3-4 years, but an accurate projection of duration requires reliable data on needs; for example, what expertise, how many in what specific areas of the sector, in what countries. This type of data is very difficult to obtain.

Short-Term Courses in the Region. The FAD scheme encourages short-term training programs on specific topics. In this study, seven of nine FAD-supported training programs are short-term, non-degree courses. The emphasis on short-term courses implements the recommendation of the 1981 TPS to "encourage more short-term and informal training in local institutions in specific disciplines" and to "give priority to placing trainees in training institutions in their own country or elsewhere in the Third World." The over-all positive quantitative and qualitative results and impact of the T-T scheme after 3-4 years of implementation confirm the wisdom of this policy recommendation.

It was said earlier that short-term courses are a quick and effective means to redress the immediate needs for trained technical staff of developing countries. If this view is accepted, it argues for the usefulness and continuation of FAD's "short-term" mechanisms such as "group training" and "project/program related" awards.

Criteria for Trainer Institutions. An important part of the process of FAD's T-T scheme is the application of the main criteria in selecting trainer institutions: adequate infrastructure, manpower capability, and a training program that is within IDRC's defined areas of concern and that meets the needs of a significant number of trainees. An additional criterion is the capability of the trainer institution to administer the training grant. FAD prefers having all project funds administered by the recipient trainer. This is not always possible, as in the case of RLCC where there are strict government procedures regarding the handling of foreign exchange for international airfares of participants. As the descriptive part of the study reveals, the three selected "trainers" have met the main criteria very well. An added advantage of these three institutions is their relatively strong research program, which enriches the training significantly.

RLCC, for example, draws lecturers from its mother unit, the FFRC. The use of FFRC's laboratories and experimental farms for training is also facilitated through an administrative structure whereby both RLCC and FFRC are under one director. At the same time, RLCC has been making substantial

improvements of its physical facilities through its own resources. It has increased the technical and language capability of its training staff, some of whom have conducted short-term training on integrated fish farming in other developing countries. RLCC has increased its selection of participants to include those from countries in the Middle East, Africa, and Latin America. Its international training program has expanded into other specific topics, e.g. carp seed production.

RLCC was already an established training centre when FAD arrived. Thus, FAD funds were used mainly to support trainees from developing countries. It was a cost-effective strategy for FAD. At the same time, FAD's entry gave RLCC wider publicity by funding participants from many more countries than in the first 2 years of its program. Hopefully, the program's wider geographical intake of participants will contribute toward longer term viability.

Similarly, UPM's facilities have always been more than adequate. The faculty members of the Resource Economics Department are directly involved in the research program of the AFSSRN. Through its own faculty development program and some cooperative arrangements with other faculties (e.g., Faculty of Fisheries), the teaching staff in the M.Sc. Fisheries Economics course has been upgraded and enriched. The relevance of this particular UPM program has not only been shown in a regional study of needs; it is in fact a response to the research requirements of a group of important national institutions under the AFSSRN.

In the case of SEAFDEC-AQD, the required criteria for a trainer institution were also in place at the time FAD formalized its relationship with that institution. The infrastructure and manpower quality are among the best in the region. The research on milkfish, which AFNS/FI had supported for many years, had yielded a significant scientific technology that needed to be disseminated. This offered a natural foundation for a training program.

Consultation-Negotiation Process. As the descriptive documentation shows, the identification of a trainer institution was always done either at

the suggestion of or after discussion with the program officer of a research division. This strategy is consistent with FAD's support function. FAD, for example, was introduced to RLCC and SEAFDEC-AQD by AFNS/FI. The UPM M.Sc. Fisheries Economics course was originally encouraged by SSD, and it was after discussion with SSD and others that FAD started negotiations with UPM for a longer term support of the program.

It is in the negotiation process with the recipient institution where FAD performs its professional role. In all three cases, the FAD program officer took the initiative in negotiating the details of the training project, but continued to maintain the consultation process with the research division representative. Another example of how FAD exercises its professional role is in the improvement of the instructional materials of the trainer institution. This has been done at SEAFDEC-AQD and at RLCC.

In all three trainer institutions, FAD used its earlier "institutional development" category in providing project grants. This mechanism allows longer term support as compared to other FAD approaches such as "group training" or "program related awards." It is also the least time-consuming in term of staff work, especially when compared to individual awards or a project-to-project grant under group training.

There is no doubt that the success of the T-T scheme depends to a great extent on the quality of the consultation process between FAD and the collaborating division of IDRC. The field officers of the program division know their own objectives and priorities. FAD's role is to serve these priorities by increasing or strengthening capability in research. Program division officers know the kinds of training support needed by the institutions with whom they are related. Their input is crucial in the identification of the trainer institutions and even more so of trainee institutions. The same input is necessary in the selection of trainees and in the negotiation process with the recipient.

Monitoring. The intensity and frequency of monitoring visits and correspondence varied from institution to institution. From the standpoint of

staff time and work, the projects with the three trainer institutions were less labour-intensive because they were recipient-administered. A monitoring visit was necessary when specific problems occurred during project implementation; for example, the pressure on UPM to sub-contract the pre-M.Sc. summer program in economics to a third party; and the poor coordination and cooperation between researchers and training staff at SEAFDEC-AQD.

Matching up with institutions that have the capability of administering a donor-assisted project has a definite labour-saving advantage to IDRC staff. A recipient-administered project of a few year's duration has less problems and requires much less exchange of correspondence and monitoring visits.

Impact on Expertise. The variety and range of job titles of the 57 respondents illustrate the many types of expertise needed in a research and training institution. Moreover, staff in most institutions in developing countries may have specific job titles but their actual functions and responsibilities are oftentimes multiple. For example, it is common to see a biologist or fisheries officer function as technician, researcher, and extension worker. This is because many of the trainee institutions do not have one specialized function. In many cases, they have research, development, and production functions.

The following job positions show the wide variety and range: director of fisheries, project leader, aquaculturist, researcher, economist, lecturer, technician/biologist, farm manager, section chief, fisheries officer, head of visitors bureau, etc. Viewed from IDRC's mandate, the support by FAD to these various personnel may be interpreted as a flexible response to the many real and related needs for expertise of institutions in developing countries. Given this situation in these countries, it is difficult for FAD to confine its grants and awards strictly to support training of researchers.

As a strategy, the impact of the T-T scheme is definitely an improvement over FAD's pre-1983 program, which was characterized mainly by individual awards spread out too widely and thinly in many institutions of the Asian region. Still, the data from 1983-87 show that the T-T scheme was not

selective enough to make a significant impact in numbers in many recipient (trainee) institutions. For example, most of the institutions received only one or two awards for their staff. From the standpoint of institution capacity building, the impact may be considered weak. Perhaps the 3-4 years of the scheme was not long enough to create a critical mass in some important national research and development institutions. One thing, however, that the data reveal is the strong impact of the scheme on the individual trainees in terms of the positive experience gained from the various training courses.

Impact of the RLCC Program. Seven years of the integrated fish farming course produced a total of 181 trained aquaculturists from 33 countries. Thirty-five of this total were funded by FAD from 1984 to 1987. Of the 21 FAD-funded participants from 1984 to 1986, 18 were in institutions in which AFNS/FI has research project.

FAD's entry in RLCC in 1984 came at the right time. It augmented the number of participants, thus contributing significantly to the financial viability of the program. FAD also responded to requests for support from some African and Latin American countries, making the RLCC course even more viable and truly international. The extension of the FAD support to trainees from Africa and Latin America was to be expected, considering that AFNS/FI has global program responsibility.

In terms of the knowledge and skills provided by the course, the evidence of effectiveness is reflected in the testimonies of those who responded to the questionnaire and those who have sent feedback to RLCC and NACA. The responses and feedback were rich and specific in describing the knowledge acquired and the successful application of the technical skills acquired in the work of the trainees. Among several of the respondents, this new knowledge and these new skills have changed their work habits and practices. They have become more scientific and resourceful. All of this was possible because, for these trainees, there was a clear objective in sending them to the course and, on their return, assigning them to positions/functions that gave them the opportunity to apply their new knowledge and skills.

Moreover, they were encouraged by the support (e.g. budget funds) and/or incentives (e.g., promotion, salary increases) provided by their superiors.

On the related "Carp Seed Production" workshop that RLCC offered as a 1-month course, the respondents from three countries were as satisfied with what they learned as those in the "Integrated Fish Farming" course. The application of the training to development and research work was enhanced by their involvement in AFNS/FI-funded projects.

The limited FAD support for RLCC/FFRC staff development improved not only competence in training but also in research. In 1985, AFNS/FI officially started a research project at FFRC on Integrated Fish Farming. This research project also included some training funds for some FFRC staff. On their own, the Chinese scientists both at RLCC and FFRC have collaborated and published, in 1987, several research papers on freshwater aquaculture and integrated fish farming. All these enhanced the training/research capability of RLCC and FFRC as well as illustrating the advantages of collaboration.

Impact of UPM Fisheries Economics Program. The number of graduates (five) of this 2-year degree program may be less than satisfactory if assessed on the basis of the number of FAD- supported candidates (eight) admitted to the course in 1985 and 1986. One weakness of the program was the fact that two graduates were not employed by their university (Kasetsart) after graduation. The other weakness was the inability of the AFSSRN-member institutions to recommend adequate numbers of strong, qualified candidates to UPM. The original number of places with FAD funding (six per year) was never filled because of the lack of strong candidates from the network members.

These weaknesses were remedied after 1986. For example, the nominating institutions were required to attach a guarantee of employment to the application forms. An honorarium and an official appointment were given to the UPM coordinator to encourage him to visit and generate better candidates from the member institutions in the network. In addition, a budget was set aside for the UPM thesis supervisors to visit their advisees during the

data-gathering period in their home countries. The students were also given a limit of 3 months to complete their data-gathering activity.

The mixed quality of feedback from two of the respondent-graduates illustrates a weakness pointed out earlier. One had to find a substitute job after her university was unable to hire her. The other one is very well utilized in fisheries economics research by his home institution.

There is a need to monitor the future results of the program after the implementation of the measures taken to remedy the weaknesses. Future support to the program should depend on these results.

The "Fisheries Economics for Non-Economists" short course was a complement to the M.Sc. program. It was also an attempt to link more closely SEAFDEC-AQD with UPM and vice-versa (through the "Aquaculture for Economists" course of AQD). Two sessions in 1985 and in 1986 attracted 25 participants. Those who responded to the questionnaire appreciated the UPM program for giving them skills in economic analysis and how to incorporate economics in planning, monitoring, and evaluation of fisheries projects. Although attempted in a very limited way, the linking of two trainer institutions to complement each other's programs is a very attractive and enriching means of promoting inter-institutional cooperation. More opportunities for such linkage should be explored and encouraged.

Impact of SEAFDEC-AQD Programs. Among the three trainer institutions, AQD produced the most number of trainees. This is because AQD offered annually four FAD-supported short courses and one degree program. The number of trainees in one course (Hatchery of Marine Finfishes) was the highest because of the large national milkfish program of BFAR in the 12 regions of the Philippines, which urgently needed technically trained manpower.

Based on the responses received from former participants, the degree of successful application of knowledge and skills learned from the short-term training varied from course to course. There were factors in the home country that limited the full utilization of their newly gained skills. For example,

the current popularity among Southeast Asian countries to culture prawn diverted several former trainees (four respondents) to this industry. A Filipino and an Indonesian were sent by their institutions for an M.Sc. soon after their return from training. This move prevented them from applying immediately their newly gained knowledge but may have longer term benefits for the institution.

Despite these shortcomings, a large number of the respondents were generous in enumerating the benefits they gained from training and the many ways they had directly applied these in their work. In this group were former trainees from Kiribati, India, Sri Lanka, and China.

Half of the respondents in the M.Aq. course occupied managerial positions (five of 10 respondents). This is not surprising considering that the M.Aq. is for senior aquaculturists and is not intended as a research degree. The others were in various types of job: training officer, instructor, fish biologist.

As in the case of the participants in the "Economics for Non-Economists" course, those who attended the "Aquaculture for Economists" were grateful for their exposure to the technical aspects of aquaculture. The five who responded to the questionnaire were unanimous in stating the usefulness of the course in their current work.

Impact: Trainee Institutions (NIFI and BFAR). The 145 awardees of FAD were distributed among more than 40 institutions, but NIFI and BFAR were two of the most important of these national research-development institutions. Both of them have extensive (nation-wide) field stations and their programs combine research and development (dissemination and production). NIFI and BFAR are also major recipients of research support from AFNS/FI.

All the FAD-supported trainees in NIFI are still connected with the institute and are able to practice the skills they gained from training as shown in their responses.

The big group of FAD-supported trainees in BFAR (14) has been providing staff with technical expertise to the National Bangus Breeding Program. The group was selected for assignment in four regional field stations that were covered by project support from AFNS/FI. The latest progress report of BFAR to AFNS/FI confirmed the assignment of the trained staff in the project. Although BFAR had been slow in providing incentives to most of the former trainees, the statements of the respondents reveal their ability to apply the knowledge and skills gained from the "Hatchery of Marine Finfish" course at SEAFDEC-AQD.

National agencies like NIFI and BFAR with nation-wide research and development programs in specified problem areas are ideal trainee institutions. These institutions guarantee a high percentage of trainee utilization and application of knowledge and skills from training.

Problems. The regional/international training programs of all three trainers have been initially encouraged by outside donors. Donor support enabled these institutions to develop their training courses and attract participants from within the Asian region and even beyond. Considerable improvements in the course offerings (e.g., content organization and instructional techniques) were made in the 3-4 years that FAD support was available. After this period of support, the question for IDRC is how to help these trainers attain self-reliance.

A need that was commonly expressed by institutions covered in this case study is for a continuing presence of FAD beyond the 3-4 years project support. As in research, institutional development to strengthen training capability and for self-reliance is a long-term process. Perhaps a 10-year period of support to trainer institutions is a more realistic perspective. This is especially justifiable in the case of the three trainer institutions because their programs were making good progress and their service to developing countries is being appreciated and recognized. Furthermore, a longer term support would enable FAD to create a critical mass of trained personnel in selected institutions that have a strong research-development-production program.

The common needs expressed by officers of the trainer institutions are in staff development (including administrative staff) and upgrading of training equipment. For these institutions to continue developing their training programs, gain more reputation, and attract more participants, FAD's continuing assistance is a worthwhile investment. There are many cases of projects and programs intended for long-term survival but that die with the abrupt withdrawal of donor support.

Direct versus third-party relationship between FAD and the recipient was a problem in the negotiation process in the UPM and RLCC cases. The principle of direct grants to the institution offering the course should continue to guide future FAD-funded training projects. The arrangement is not only cost- and labour-saving for FAD; it also enhances recipient administrative capability. Furthermore, it is consistent with IDRC's responsive style.

A major weakness of the projects in all three trainer institutions is evaluation, especially the lack of a mechanism for systematic feedback from former trainees. A small budget to followup participants might enable the trainer institution to accumulate good data about the various aspects of its program(s). In addition, a periodic evaluation can be useful in making the training courses responsive to the needs of the trainees, particularly the applicability of the technology in their local environment. Related to this exercise is the importance of a national/regional survey of institutions/agencies having an interest in fisheries. The data from the survey can be beneficial in projecting accurately the clientele needs, and the number of times and duration of a specific short-term course. Another useful evaluation activity is an in-depth assessment of former trainees' real impact institutionally and nationally.

The desirability of connecting the awards more closely with institutions and researchers with research project support from IDRC requires a lot of time and close monitoring of the program officers of FAD and the research divisions. The data show that some of the trainees selected by

SEAFDEC-AQD to attend its courses could have been monitored more closely by FAD to make sure most of them were from AFNS/FI-related institutions.

The problem of cooperation by the research staff of SEAFDEC-AQD eased somewhat with the provision of attractive honoraria to researchers for their lecture and practicum activities in the training course. Despite this, the monetary rewards are of low value compared to producing scientific papers for publication.

Coordination and cooperation between UPM and the AFSSRN institutions in the M.Sc. course was also a problem in the first 2 years. There was little contact between the UPM-based coordinator and the network members. The UPM coordinator's assignment was unofficial. He was not given an honorarium for his extra work of coordination. Thus, he hardly utilized the budget to travel to the member institutions of AFSSRN.

Research and training are explicit functions in all three trainer institutions (RLCC, UPM, and SEAFDEC-AQD). The problem of relationship between these two functions is one of coordination and cooperation. This is especially true of the research staff whose cooperation and participation are necessary in the training courses. The case of SEAFDEC-AQD was cited earlier. In UPM, the coordinator's work in training does not count for merit in promotion although his research activities do. In RLCC, a core of full-time lectures have to be assigned to the course; the scientists from its mother unit, FFRC, provide supplementary lectures. The problems are mainly administrative. In the development of a research and training program, it should be the responsibility of the head of the institution to clarify the priority of research and training and how much commitment research staff should give to the training function.

The lack of an adequate pool of strong and qualified candidates from the AFSSRN members and the failure of the sending institutions to employ their nominees after graduation were already mentioned in the earlier section on impact of the program. In addition, the students doing thesis research in

their home country did not have the benefit of direct supervision by their thesis adviser. These problems were remedied recently.

CHAPTER III

IMPLICATIONS

This section discusses the implications of the findings on the Selective Trainer-Trainee Scheme, FAD's program and mechanisms, and IDRC's training policy.

(1) To see the real impact, the T-T scheme should perhaps operate in selected trainer and trainee institutions for at least 10 years. As implemented from 1983-1987, the scheme was not selective enough in the choice of trainee institutions. The distribution of participants by institution was thin, with a large number of trainee institutions receiving only one or two training slots. One way of making the scheme more selective is to identify and specify important national research and development institutions (e.g., NIFI and BFAR) in various countries for intensive training support of their staff. FAD support should give high priority to these types of institutions, especially if they are organized as networks. It is necessary to conduct a thorough survey to identify these high priority institutions, to assess their manpower capabilities and needs in specific problem areas, and to project the period of support to achieve a significant impact.

The survey of trainee institutions should also include the identification of trainer institutions to respond to the needs of trainee institutions. The data from the survey should help in projecting the period of support required by the trainer institutions.

The scheme is less costly for IDRC in time and effort compared to individual awards directly administered by IDRC. The scheme, therefore, deserves high priority over individual awards-type programs.

(2) Emphasis on short-term courses should be kept as a priority to hasten the building up of trained manpower capability. Moreover, if FAD defines its role broadly to include dissemination and utilization of research results through training, short-term training is an appropriate strategy to adopt. Short courses are also relevant because very often staff members of research institutions in developing countries take on multiple assignments such as researcher/technician, researcher/manager, technician/extension worker.

(3) Project support followup by AFNS/FI of recipient trainee institutions should enhance the impact of the scheme and promote the utilization of acquired knowledge and skills. Such followup will also exemplify the effectiveness of interdivisional collaboration.

(4) The research mandate of IDRC should be viewed broadly, e.g., from problem identification to research results dissemination/utilization. For FAD, this broad interpretation of mandate means using training as an effective dissemination strategy.

(5) Related to the broad perspective of IDRC's research mandate is the flexibility in the kinds of staff or personnel to be supported in training courses. As the data show, the functions and needs of the trainee institutions in developing countries are often multifarious, as are the responsibilities of the technical staff. It is unrealistic to peg FAD support solely to training of "researchers."

(6) The criteria for selecting trainer institutions should be retained. This would prevent substantial portions of limited funds from going into "institution building" such as physical infrastructure and development. The greater part of FAD funds in training projects should go to "capacity building" such as expenses of trainees. Furthermore, the criterion of "administrative capability" should be added to enable most, if not all, of FAD funds to be administered by the recipient.

(7) The consultation process between FAD and the collaborating division(s) should be close and intensive during the process of identifying institutions, negotiating with recipients, selecting of trainees, and monitoring. Where FAD can play its support function professionally is in such areas as improvement of curriculum or teaching materials for training and in evaluation.

(8) The three trainer institutions covered by the study deserve IDRC's continuing presence in their training and research activities. The specific areas where FAD's continuing support is needed are in upgrading the training and administrative staff, and improvement of teaching materials and equipment. Inasmuch as these institutions have a common need to improve their instructional materials and equipment, perhaps a program of workshops to exchange ideas and improve practices might be useful to all.

(9) A specific recommendation for UPM is for its M.Sc. in Fisheries Economics course to expand its intake of students outside the AFSSRN group and outside the Southeast Asian region. This would provide wider publicity of the program and encourage better quality candidates.

(10) To help RLCC continue towards becoming a strong regional centre for training and research and aquaculture, FAD should consider further institutional support for staff upgrading.

(11) FAD has developed a variety of programs and mechanisms through which it channels its support for "institutional development." These programs and mechanisms should apply to both trainer and trainee institutions, especially if the latter are limited in number and carefully chosen. Mechanisms such as group training, program-related awards, and project-related awards, should be flexibly applied depending on specific needs. In all instances, relationship with trainer institutions should be direct rather than through a third party.

APPENDIX A

POST-TRAINING FOLLOW-UP
OF
IDRC/FAD-SUPPORTED TRAINEES, FISHERIES PROGRAM

QUESTIONNAIRE

PERSONAL/PROFESSIONAL INFORMATION

1. Name: Mr/Mrs/Miss.....
2. Citizenship:.....
3. Address:.....
4. Age:.....
5. Civil Status:.....
6. Educational Status:

	Degree	Major	Minor
Undergraduate:	.....	.....	.....
Master's:	.....	.....	.....
Doctoral:	.....	.....	.....

	Before Training	After Training (current)
7. Position/Designation:	.....	.....
8. Name/Address of Agency/Employer:	.....	.....
9. No. of staff under your supervision, if any	.....	.....

10. Please specify and describe what knowledge and/or skills you learned from the training course you attended.

11. On your return to your home institution, are you able to apply these knowledge or skills? If so, please give and describe specific examples. For example, what specific knowledge and skills from the training are you able to apply in your present activities? If not, what prevented you from applying the knowledge/skills you learned.

12. Has the training changed your ability to work in your home institution? Please specify and describe the changes in your work attitudes or habits or your methods or techniques of operation. If your training has not changed your ability to work, please explain why this did not happen.

13. Why were you chosen to attend the training course? For example, was it your superior or supervisor's intention to involve you in a research project after your training? Please describe the project. Was it an IDRC-supported project? Or, were there other reasons or objectives for sending you to the training course?

14. Has your home institution given importance or recognition of the training you underwent? Please describe the ways in which your institution recognized the value of your training. For example, what support, rewards, and kinds of incentives were given to you since your return from training?

15. If you have been engaged in research since your return from training, how would you assess the significance or contribution of your projects) on your institution's/organization's research program? Please specify or describe this significance or contribution.

APPENDIX B
TRAINER-TRAINEE CASES

The three trainer institutions (RLCC, UPM, SEAFDEC-AQD) and two trainee institutions (National Inland Fisheries Institute, Bangkok, Thailand (NIFI) and the Bureau of Fisheries and Aquatic Resources, the Philippines (BFAR)) were identified for support by FAD and AFNS/FI because they fulfilled the criteria of adequate infrastructure, manpower, and program of research and/or training. Moreover, these institutions are part of an Asian fisheries research network receiving AFNS/FI support.

All three trainer institutions were recipients of longer term FAD support (3-4 year) in their training programs. This support was mainly to pay for the participants' or trainees' expenses to attend training courses. Some funds were also made available to improve the trainers' institutional materials and equipment and to upgrade some staff.

This appendix describes the resources and programs of both trainer and trainee institutions; the process of collaboration between FAD-AFNS/FI and the trainer/trainee institutions; the collaboration between trainers and trainees; and the problems and outcome of such collaboration.

Case 1: Asian-Pacific Regional Research & Training Centre for Integrated Fish Farming (IFFC) or Regional Lead Centre of China (RLCC), Wuxi, China

Background

The RLCC (also known as the IFFC) is a subsidiary of the Freshwater Fisheries Research Center (FFRC), which is under the Ministry of Agriculture

Animal Husbandry and Fisheries (MAAF). Established in 1981, IFFC became the Regional Lead Centre of China, one of four lead centres in a Network of Aquaculture Centres in Asia (NACA). NACA is a collaborative project of UNDP/FAO, and most Asian national governments. As one of NACA's lead centres, RLCC concentrates on national and international research, training and information exchange in integrated fish farming.

Trainer Institution

For a national or regional institution to qualify as "trainer" under FAD's T-T scheme, great importance is given to adequacy of infrastructure, manpower capability and relevance of the training program. These criteria are described in an earlier section of this report.

Infrastructure. With support from the government of China, the RLCC built a training and research building, a dormitory for 30 international participants on 12.5 hectares of land not far from its mother unit, the FFRC.

In the last 2 years, a concrete road leading to the compound, an additional 30-person dormitory, another modern training and research building, and a basketball and volleyball court have been added. The total cost has been 3.13 million RMB (USD 843,665), an investment to illustrate China's commitment for the training program. The fixed capital investment now totals 30 million RMB (USD 8.086).

In addition, RLCC has continuously improved and updated its training equipment, materials, and services. For example, there are now two sets of video tape machines and more than 20 cassette tapes for training. The training building has its own modest laboratory room and enough microscopes for 60 participants. A small library is stocked with English books, journals, and magazines. An integrated fish farming textbook was produced for this course. The English version of the integrated fish farming manuals and will soon be ready for printing as a textbook with assistance from IDRC and NACA. Four of the chapters have related video tapes to supplement the printed materials.

FAD-ASRO sponsored a workshop in RLCC focusing on improvement of both instructional and materials development.

Manpower. In terms of manpower capability for training, RLCC has six full-time and 12 part-time lecturers for its regular 4-month international training course on integrated fish farming. The part-time lecturers are drawn from the 94 high and middle ranking scientists of nearby institutions such as Nanjing Agricultural University and Wuhan University and Wuxi muncipality. To assist senior Chinese-speaking lecturers and foreign participants, 10 interpreters are available. An important incentive RLCC provides its young interpreters is to have them gain technical expertise in aquaculture so as to enable them to help more effectively the English-speaking participants. For example, Minh Kwan-Houng, who was studying aquaculture economics in Nanjing Agricultural University, was scheduled to complete a diploma course in July 1988. Such young potentially promising and qualified English-speaking staff members can be encouraged to pursue masters degrees to boost the number of English-speaking staff in RLCC. In addition, Chinese-speaking scientists have been given intensive English training in China plus research exposure as visiting scientists in English-speaking countries (with IDRC funds). The strategy has already made some impact on the program. For example, only one Chinese teacher lectured in English in 1986. In 1987, there were three, and five in 1988.

One promising RLCC initiative is the sharing of its technical and research staff to do training in integrated fish farming in developing countries. For example, Hu Bao Tung and two colleagues gave a 1-month training course in Bangladesh. There was a plan to send Minh Kwan-Houng and Yang Hua Zhu to India to conduct a similar training.

For three weeks in January 1986, four staff members of RLCC (Zhu Lingeng, Fei Yingwu, Yu Shigang, Chen Bao Hua) were funded by IDRC to visit institutions, former RLCC awardees, and freshwater aquaculture farmers in the Philippines, Thailand, and Sri Lanka. In their report the Chinese promised to make improvements in their training content and methodology after seeing

conditions of freshwater fisheries in these countries as well as listening to the information and experience of the former awardees.

IDRC has provided some assistance in upgrading the research and training manpower of RLCC and FFRC. Under FAD Program Related Awards support, four staff members were sent to three different courses: Zhang Laifa completed one year as a visiting scientist attachment in water quality control at Auburn University, Georgia, USA; Li Hui went to the Fish Genetics short course at the National University of Singapore; and Miao Wei-Min and Shen Bin went for M. Aq. courses at the NACA UPV-SEAFDEC-AQD in the Philippines. Zhang is now a researcher in the AFNS/FI project at FFRC on biological models of high-yielding integrated fish farming in China. Li and Shen are now pursuing Ph.D.s in Illinois and Minnesota, respectively, under World Bank funding. Miao is a full-time lecturer at RLCC's integrated fish farming training program.

Under AFNS/FI project funding, three RLCC research scientists participated in the Asian Fisheries Society Forum in Manila in May 1986. One other scientist is under attachment for 12 months at the Freshwater Institute in Winnipeg, Manitoba, Canada. Four other scientists went on a study tour to Canada in September 1988 to examine development of collaborative program linkages. The institution's retention rate is high and there is a good match between two of the individual's training programs and their institutional assignments and activities.

Relevant Training Program. The relevance of RLCC's program to aquaculture needs and interest of other developing countries can be seen in the wide spread of the participants' country of origin. From 1981 to 1987, the annual 4-month integrated fish farming course trained a total of 181 fisheries researchers and production managers from 33 countries of Asia, Africa, Latin America, and the Middle East. The list of 30 participants in the 7th training course (1987), provides a good picture of the regional and country spread of the trainees: Bangladesh (1); Burma (2); India (2); Korea (3); Malaysia (1); Nepal (2); Pakistan (2); Papua New Guinea (1); Philippines (1); Sri Lanka (1); Thailand (4); Vietnam (1); Cameroon (1); Ivory Coast (1);

Kenya (2); Nigeria (1); Colombia (1); Ecuador (1); Mexico (1); Peru (1). In fact, the list of participants' since 1981 always showed a good country spread. These participants were funded by IDRC-FAD and other sources such as the World Bank, the Asian Development Bank, the UNDP, etc.

Administration. There has been a change not only in the leadership but also in recognizing the importance of putting both research and training under one director. Thus, Guo Xianzhen is the new director of both FFRC and RLCC. This allows for closer cooperation between the research and training, especially the sharing of manpower and facilities between the two units.

Processes

Identification of Institution. FAD's decision to emphasize its assistance to a select group of trainer and trainee institutions requires as a first step that the FAD program officer consult with colleagues in the research divisions. In the case of RLCC, AFNS/FI made possible FAD's initial contact with the NACA coordinator. NACA has been the primary supporter of RLCC from 1981-1983. AFNS/FI and NACA have been closely associated through their collaborative support of research projects in some NACA lead centres. FAD had good reasons for exploring training support at RLCC. First of all, AFNS/FI recognizes the importance of encouraging research and development of freshwater aquaculture and the integrated fish farming technology. Secondly, China has a long experience and successful technology in the integrated freshwater fish farming. Thirdly, there was an eagerness within IDRC to encourage the Chinese government to share its applicable and successful technology with other developing countries. This was part of the agreement between IDRC and China. Finally, preliminary information about RLCC indicated that it had the infrastructure, existing training programs, and manpower capability.

Negotiations. The link with NACA was critical in the development of the T-T scheme. It illustrates how FAD developed a viable linkage strategy

with a significant institution that has assisted and invested in the birth of several important fisheries training programs in the region.

One of the questions that FAD had to resolve in linking with NACA was: how can FAD's collaboration with a UNDP-FAO sponsored organization be done for the greater benefit of the recipient trainer institution? For example, what are the advantages and disadvantages of channeling FAD funds through NACA as against a direct grant to RLCC? Although channeling of FAD funds through NACA would have saved more FAD support staff time and effort than direct FAD-recipient funding, there were concerns about the bureaucracy involved in UN-type agencies plus the 15% service charge FAD would have to pay.

As actually arranged, FAD made a grant to the trainer and NACA, FAD, and AFNS/FI coordinated in the identification and selection of trainees. This strategy worked out satisfactorily, but required AFNS/FI close participation in the choice of trainees.

At FAD's first meeting with the NACA coordinator on 25 October 1982 in Bangkok, the discussion centered on training programs in two of NACA's lead centres, one of which is RLCC. FAD had two concerns: one was the high cost of the 4-month integrated fish farming course, USD 7500/trainee. The other concern was AFNS/FI' interest in NACA's training program. During FAD's consultation with AFNS/FI in ASRO, it was agreed to be cautious about possibly providing core support to NACA.

The next contact came in December 1982 at the NACA Second Advisory Committee meeting in Bangkok. AFNS/FI and FAD were at the meeting as observers and had a chance to meet the RLCC director. Discussions concentrated on NACA, which was now feeling the financial pinch and was anxious to see other donors come in with funding in RLCC. NACA funds (from UNDP/FAO) could not fully meet the original target of 25 trainees per year. In 1981, there were enough funds for only 18 trainees; in 1982, for 16. The RLCC director was very concerned about the relatively small number of trainees that could be funded. He was afraid that if the 1981 and 1982 figures

continued, he might not be able to justify to his government the program's continuity. After the meeting, AFNS/FI and FAD decided on a strategy:

1. IDRC's role should aim to strengthen capability of NACA's member/cooperating institutions through research and training support.
2. FAD's contribution to NACA's training programs should be closely linked with institutions in which AFNS and Information Sciences divisions have major interest and inputs. (This fits very well with FAD's T-T scheme.)
3. FAD's support should be in the form of group training.
4. IDRC should not provide core support.
5. FAD should think of supporting five trainees per year, provided there is a clear expression of need from target institutions.

On FAD's first visit to Wuxi, the following issues were discussed with the RLCC director:

1. Interest and Need. FAD had serious reservations about the need of integrated fish farming in other developing countries. The RLCC director argued that he was sure of genuine interest and need in five countries where there are projects in freshwater aquaculture (Thailand, Sri Lanka, Pakistan, Bangladesh, Nepal). He stressed that the best way to stimulate research and development in integrated fish farming was to develop a cadre of trained scientists and production managers in these developing countries.

2. Number. The RLCC director suggested support for seven to nine trainees; FAD mentioned five per year for 2 years as an easier number to fund.

3. Linkage. The RLCC director preferred that FAD support be made directly to RLCC rather than through NACA. From FAD's standpoint, a direct linkage could provide better control in the choice of recipient institutions and participants. At the same time, FAD could avoid the cumbersome UNDP/FAO procedure if a grant were to go through NACA.

4. International Travel and Purchase of Light Equipment. RLCC did not have the administrative capability to handle the participants international

travel and the procurement of some foreign-brand equipment such as videos and photocopying machines. These items therefore were handled by FAD; the other expenses of participants were handled by RLCC.

Project Proposal (Phase I). There was agreement in principle between FAD and AFNS/FI to proceed with a modest 2-year project (five trainees per year to start in 1984) under FAD's "institutional development" mechanism. The project proposal from the Chinese was straightforward. A 2-year budget of CAD 105,000 was broken down to two main items -- participants' expenses CAD 90,000; equipment CAD 15,000.

Despite the simplicity of the project, the RLCC director was hesitant to sign the Memorandum of Grant Conditions (MGC), the IDRC document that describes the roles and responsibilities of both the recipient and the donor. He delayed until a visit was made in early May 1984 when he raised questions, after which he consulted with Beijing. This being RLCC's first project with IDRC, the director was concerned about some provisions in the standard MGC. For example, he wanted to know how rigidly IDRC would scrutinize RLCC's administrative and financial procedures; how much consultation RLCC would have to do on publications, productions, results dissemination when IDRC was not contributing to these materials and reports. These were all explained to his satisfaction.

One other issue that confused the RLCC director was the additional five individual Program Related Awards (PRAs) that were contracted to RLCC. He did not understand why the PRAs were in a separate contract when the funds were from the same source. FAD's various categories of awards had to be explained to him. In the case of RLCC, the use of the individual awards was to respond to the sudden increase in demand from several developing countries for training in integrated fish farming. PRA is also a flexible and useful strategy of avoiding the tying up of FAD funds through a project mechanism in a relatively new and untried institution.

Consultations on FAD-Supported Participants. FAD relied on AFNS/FI to decide from which institutions the FAD-supported trainees would come for

RLCC's fourth training course. It was agreed that the first 10 FAD-funded participants should come mostly from institutions where AFNS/FI had existing project relationships: e.g., SEAFDEC-AQD and BFAR, in the Philippines; Department of Fisheries of Thailand; Inland Fisheries Department of Sri Lanka. One Indian and another Indonesian funded under FAD were from institutions in which AFNS/FI did not have an active project relationship at the time. Support was seen as an investment for future project development.

Of the first 10 participants, five were charged to the budgetted slots under the grant agreement with RLCC. The unforeseen demand for the course from institutions of interest to AFNS/FI had to be met from the more flexible PRA mechanism. One of the advantages of FAD's variety of funding mechanisms is its flexibility in responding to the needs of such a program as the T-T scheme.

Phase II. It was felt that a 2-year support was too short to develop a sufficient cadre of trained freshwater aquaculturists in IDRC-related institutions or to enable RLCC to gain sufficient strength and prestige to attract support from other countries and donors. Negotiations for a second phase started early in year two of Phase I. NACA and AFNS/FI recommended a firm commitment in number of participants under a project for better planning. This meant doing away with the year-to-year additional request through the flexible PRA. Thus, another 2-year project to support 10 participants each year was approved in October 1985 for the 1986 training session. The budgetary items in Phase II remained almost the same as in Phase I. The regional and institutional intake of FAD-supported participants under Phase II had been extended to African and Latin American countries. This expansion to Africa and Latin America helped to popularize the course in countries of these regions.

The IDRC "presence" at RLCC continued even after the end of Phase II in 1987. In 1988, FAD and AFNS/FI sent four participants to RLCC. In addition, FAD supported activities to improve curriculum and instructional materials, and was interested in a plan to link RLCC with the new fish disease training and research program at UPM, Malaysia.

Monitoring. This activity included visits to sites, exchange of correspondence, and progress reports of the recipient. An established training project such as RLCC's needed no intensive monitoring. The necessary infrastructure, program, and procedures were in place. The in-China cost of support for each participant was at a fixed rate. The simplicity of the project required no frequent correspondence.

The reports of RLCC from 1985 to 1987 about the training course repeatedly mentioned two main problems. One was the English proficiency of the teaching and financial and administrative staff. The need to train the staff members in English had been stressed for RLCC to continue offering a quality international training program. This could be done either through a formal training in English language or by sending out young staff to upgrade their technical skills and English speaking/writing ability. The second weakness that was admitted was a lack of systematic evaluation or followup of former participants. The collection of feedback from former participants had been in the form of a few letters sent back to RLCC. A regular and systematic process of getting feedback would undoubtedly provide a rich source of information about the program's strong and weak points; for example, duration of training, balance between theoretical and practical exercises, applicability or adaptability of Chinese technology in other developing countries, teaching methods and techniques, administrative procedures, social relationships/interaction, and others.

Impact

Numbers and Regional/Country Distribution. The seven offerings from 1981 to 1987 yielded a total of 181 trained participants from 33 countries of the Asia-Pacific region, Africa, Latin America, and Europe. Thirty-five (19%) of this total were FAD-funded. About 81% of the participants were from Asia and Pacific countries: Thailand (26), Philippines (23), Malaysia (16), Sri Lanka (16), India (13), Nepal (10), Bangladesh (9), Burma (9), Pakistan (7), Indonesia (5), accounted for 74% of the total participants. Seven other countries in the same region sent one to three trainees. In the last 2 years

of the program, more African and Latin American countries started to take an interest in the Chinese integrated fish farming program. Nine African and six Latin American countries provided 19% of the total figure of trained aquaculturist in integrated fish farming from 1981 to 1987. The active interest and participation of African and Latin American countries are indicative not only of the interest but also of the increasing reputation of China and the RLCC in integrated fish farming technology.

IDRC Entry in RLCC. At the time of IDRC entry into RLCC in 1984, the RLCC course was already 3 years old and NACA was the sole supporter of the program. The number of trainees each year during the first 3 years ranged from 16 to 18. There was concern both by NACA and RLCC that the program's long-term existence could not be justified unless it attracted a minimum of 25 trainees per session. FAD's Phase I support enabled RLCC to increase its participant intake; to gain more experience; and to improve the quality of its training program (e.g., the handbook was revised and translated into English). In Phase II (1986-1987), RLCC saw the participation of Middle East, African, and Latin America countries and other donor agencies in its training program. The Chinese government, encouraged by this development, provided RLCC substantial financial support to expand and improve its building and other facilities.

FAD's institutional support ended with the 1987 group. Despite this, RLCC expected 36 participants (including 20 from Iran) in 1988. There is no firm evidence of the significance of FAD's entry and support at RLCC's crucial stage in 1984. But the list of participants and other developments in the last 2 years (1986 and 1987) provide indications that FAD's timely support in 1984 bought time for RLCC to gain more experience; to improve the training program; to attract attention and participation from other countries of the Middle East, Africa, and Latin America. These developments provided RLCC the argument to encourage the Chinese government, other donors, and countries outside Asia to support its integrated fish farming training course. The director accepted as "reasonable" this interpretation of FAD's role in RLCC. NACA's coordinator also agreed with this view. If RLCC's future training course continues to attract wide donor and country participation and becomes

more self-reliant, such developments will strengthen the hypothetical notion that IDRC support came at the right time and made significant contributions to an important institution and its international training program.

Training Feedback. In the 4 years of support, FAD funded a total of 35 participants. Of this number, 25 were funded from the two "institutional development projects" and 10 were from the PRA mechanism. The 1984-86 FAD awardees from the Asia and Pacific region in the Wuxi integrated fish farming course numbered 21. These were sent a questionnaire in December 1987. Five of 21 returned the questionnaire — two each from Sri Lanka and the Philippines and one from Nepal.

A 36-year-old trainee from the Ministry of Fisheries, Sri Lanka, was a trout aquaculturist before he joined the 1984 RLCC course. He was assigned at first to the Dambulla and later to the Udawalawe fisheries station, which are AFNS/FI project sites. He is now an officer-in-charge of the Fisheries Station in Beragala with a staff of 20 people. There was a very specific purpose for selecting Chandrasena for the course: to assign him to a carp fisheries station after his training. He learned a lot of techniques in induced breeding of Chinese carp, fry and fingerling rearing, brood stock management, fish disease, and several types of integrated fish farming. He stated:

> "On my return to the Island, I was appointed as an aquaculturist to the Dambulla Fisheries Station, the second largest in Sri Lanka. I was responsible for the fry and fingerling rearing and broodstock management. The knowledge and skill gained from training was very helpful to me. I worked there 2 years and was transferred to Udawalawe Fisheries Station, the biggest in Sri Lanka. I participated in induced breeding of Chinese carp, fry and fingerling rearing. In 1987, I was appointed officer in charge of Beragala Fisheries Station."

Also from the Ministry of Fisheries, another trainee seemed to have been impressed mainly by the breeding and rearing methods of fry and fingerling. This was what he emphasized in his response to what he learned and applied.

Another Sri Lankan was was also an aquaculturist at the Ministry of Fisheries. He also learned much from the RLCC course and has applied the knowledge and skills he gained. He said:

> "Presently, I am doing fry/fingerling rearing and treatment of fish disease in my station (Ambagamuwa). I have applied my knowledge and skill in several ways. For example, before I do not practice disinfection in stocking or transporting fry but now I know the importance of disinfection. When I could not get organic manure, I use pond mud as fertilizer for ponds (changed work habits). When there is shortage of fish feeds, I use crushed water plant instead of soya milk in fry rearing. Before training, I treated for fish disease. Now I apply preventive measures like use of bleaching powder to prepare pond."

Another trainee who attended the 1985 course is technical assistant at SEAFDEC-AQD's Freshwater Binangonan Station. This is the gist of his testimony about the RLCC course:

> "Although the scope of the training was broad, the main focus was induced breeding of Chinese carp. I was able to share this expertise with my colleaques and barrio folks. I became more industrious and hardworking

> because we were trained to work hard. Unfortunately, I was never assigned to project studies on my return. I was expecting to be assigned to our Carp team but it had already enough people. I am now a member of the ecology team and am able to apply my knowledge in water quality analysis, plankton identification, fish disease prevention and treatment, etc."

Another trainee received an added assignment after his return from the 1986 training. In addition to being a fishery biologist in the Integrated Agri-Aqua Project of BFAR in Munoz, Nueva Ecija, Philippines, he is also officer-in-charge of BFAR's Technical Verification Unit. He felt strongly that the RLCC course was very useful. This is what he said:

> "It opened for me a new dimension in freshwater aquaculture. On my return. I was assigned as head of the Carp production center. Last October and November 1987, I conducted my first induced spawnings of big head carp using Chinese hormone. Six breeders of 2 kilos each released eggs. Since our center is a national training center, I gave several lectures on Carp production and integrated fish farming to farmers and government technicians. My home institution has given me full support in my preliminary study on induced spawning of big head carp. Also, I am given budget for integrated fish farming this year which will be duck-fish, rice-fish, and pig-fish combinations. At the end of the year, my results will be available for dissemination."

A trainee from Nepal got promoted from assistant fisheries officer to fisheries officer after his training. He has 37 staff under his supervision now (from 11 before training). The main aspects of the course he learned very well were artificial breeding techniques and hatchery management. On application of knowledge and techniques, he has this to say:

> "The Chinese model of Fish-livestock-crop (grass) integrated fish farming is getting more popular among Nepalese fish farmers. Grasses such as napier, paragrass, sudan, rye have been introduced at pond dykes, corner plots of fish farm feed. Special care of brood fish at hatcheries has been adopted which is the most important part for mass fish seed production which I learned during my training course. The training course also gave me more confidence in my work ability.

As to research, he would like to study the economic return of fish-grass integration and utilization of pond silt for energy recycle in aquaculture.

As mentioned earlier, RLCC has no systematic feedback mechanism from its former participants. When asked about indications of the effectiveness and application of the training program, there was mention of some general information such as:

- some letters from participants;
- statements of foreign officials visiting RLCC;
- news from Chinese officials assigned in foreign countries;
- Chinese participants studying abroad who have visited the Philippines, Thailand, and Sri Lanka;

- feedback received by four RLCC staff members who had contact with former participants.

Three letters to the director from former participants were presented. One said:

> "I cannot forget the successful efforts done by you and your colleagues in connection with dissemination of technical and practical knowledge regarding integrated fish farming. I am working in Hatchery where steps have been taken to start integrated fish farming system. We have prepared many feasibilities to start integrated fish farming in rural areas of Punjab. The private sector is also being involved. The training in China is very much helpful in the fisheries development and implementation is being done according to local conditions. We are sending two more participants during this year (1987), Mr. Sajjad and Mr. Khalid."

From Malaysia, the director, Fisheries Department in Labuan wrote (31 January 1987):

> "The training did help me a lot in my work in the extension division at Fisheries at headquarters in Kuala Lumpur. The knowledge I gained will help me in my new job in deciding the viability and potentiality of areas to be converted into fish ponds. I suggest that more seminars should be conducted where participants can exchange information and ideas on the finest aspects of aquaculture in their own countries. I

> also suggest that participants be exposed to your socio-cultural system to understand your people better and their way of life. To me it is important because training is not only dissemination of technology but to further relationships and friendship among people of this region."

A Brazilian also wrote last January 1987. He said:

> "I am working at CEPTA (Aquaculture Research and Training Center) and am developing research related to organic matter recycling for use in aquaculture, growth of fish in ponds and net cages, and predator control in fish larval stages. The experience gained in China during the 5th course (1985) has been very profitable. I think the course program was good, well-conducted and attended to the objectives. However. more specific information would be good about duck culture techniques, feather utilization, methods of egg preservation. My organization is interested in the collaboration and the assistance that your center is willing to provide, mainly in relation to integrated fish farming."

In the report of the four RLCC staff members funded by FAD to visit Southeast and South Asia (the Philippines, Thailand, and Sri Lanka) in January 1986, former RLCC graduates who were working in some institutions in these countries were mentioned. In the Philippines, the RLCC group met six former trainees at SEAFDEC-AQD and Tanay Research Station of BFAR. In Sri Lanka,

they talked to seven of their graduates at the Inland Fisheries Division (Ministry of Fisheries) and Dambulla Freshwater Fisheries Station. Another six former participants were at NIFI and other government freshwater fisheries stations in several provinces they visited. Aside from a better understanding of the aquaculture system in these countries, the Chinese team got feedback that they intended to incorporate in the training course.

Of the 21 FAD-supported trainees to RLCC (1984-86), 18 are in institutions where AFNS/FI had active research projects: Department of Fisheries, Thailand, two projects; Bureau of Fisheries and Aquatic Resources, Philippines, two projects; SEAFDEC-AQD, Philippines, four projects; Inland Fisheries Department, Sri Lanka, one project and one potential project; Inland Fisheries Department, Nepal, one project; Freshwater Fisheries Research Station, Malaysia, one project. Of the other three, two were from the Indonesia Directorate General of Fisheries and Directorate General for Living Resources Management, which are development arms of the government for fisheries. The third one was from the District Fisheries Development of Osmanabad, India.

The Progress Report of RLCC from June 1981 to October 1987 contained some quotations from former trainees about their efforts to apply what they learned from the training program. A trainee from Thailand who attended the 1981 course said in his letter to RLCC that he "feels very happy that I have successfully applied Chinese techniques for induced breeding of Chinese carp in Thailand." A Malaysian was quoted as saying that:

> "I have successfully applied your techniques of artificial breeding of Chinese carps and got 1.2 million fry after my coming back."

In another RLCC progress report to IDRC, two FAD-sponsored trainees were quoted to have written back to the director, Guo Xianmhen. A Nepalese trainee said:

> "Once again I would like to mention that the training course on integrated fish farming was excellent and very useful to me.... I am applying some of the techniques of fish culture and that the LRH-A hormone from China is quite useful for artificial breeding of Chinese carps in Nepal."

Then there was the Kenyan Director of Marine and Fisheries Research Institute who wrote to say that the participant he sent to the 1987 course "found the course very useful and we thank you for that."

From the NACA files in Bangkok, a few letters and returned survey forms from former RLCC trainees were reviewed. A trainee who is in charge of the Fisheries Development Center, Godaway, Lalitpur, Nepal, attended the 1986 RLCC training course. He said:

> "With the knowledge I gained from NACA training, I hope this year hatchery operation and nursery management can be done in better way and more efficiently than previous years. I appreciate the training very much."

Another Nepali, from the Tasahara Agricultural Station, wrote to Mr. Li Kang Min, former training director of RLCC. He said:

> "After coming back from China I have been very busy in constructing some of the facilities which are so essential for breeding of Chinese carps. I am constructiing circular tanks for spawning and incubating

> eggs of Chinese carps. You will be glad to know that I have for the first time started the integration of grasses with fish. I have planted Bevseem grass, oat grass, rye grass in pond dykes. The integration of fish with ducks and fish with pig has also been started. The integration of pig with fish is gaining popularity among the farmers. We have not been able to supply duckling in sufficient number, otherwise the integration of duck and fish will also be very popular in our country."

Carp Seed Production Workshop. Having gained some experience and confidence in offering international training, RLCC conducted a more specialized short course related to integrated fish farming. The 1-month course received partial support from FAD for 10 participants: three from Thailand (Department of Aquatic Science, Prince Songkhla University, NIFI, Chiangrai Fisheries Station); three from the Philippines (SEAFDEC-AQD; BFAR; UPV); two from Malaysia (Freshwater Fisheries Centre); and two from the Inland Fisheries Department of Sri Lanka. All these institutions are AFNS/FI-supported, most of them directly, others through their mother units, such as the Department of Fisheries. Participants to this workshop who returned the questionnaires have this to say about their experience.

A NIFI respondent said the following about the value and application of his training in Carp Seed Production in China:

> I am able to apply my training in spawning, disease treatment, and feeding of 3 Chinese carp species. After my training, I was assigned to work on fish breeding and seed

> production. My supervisor gives me support for my work especially my research on induced spawning and breeding of freshwater species.

Another Thai from the Chiangrai Fisheries Station said he learned the culture of different species of Chinese carps in Wuxi and Guangzhou (field trips).

> On my return to my country I applied my knowledge in breeding and rearing of broodstock. I do my research on grass carp because the climate in Chiangrai is suited to mass production of Chinese carps. Chiangrai is the center for Chinese carp seed production and I was given this responsibility upon my return.

A trainee from UPV was sent to the carp seed production workshop because she worked on tilapia breeding projects.

> We were exposed in theory and practice to different aspects such as selection and handling of breeders, hormone injection, management of eggs, fry, and fingerlings. Also the culture and feeding of good breeders to achieve high production of quality fry. The newest technique I was exposed to is the stripping method of induced breeding of carp. I feel I became more confident in what I am doing now.

Another Filipino from BFAR, said that despite the absence of support, rewards, or incentives, she has gone ahead to work on induced spawning of Chinese carps instead of "always tilapia".

> We have started the induced spawning of bighead carp using HCG. But then during the incubation stage, we have a problem of low water hardness. So we have not yet reached the culture of fry in ponds to produce adult carp.

From Sri Lanka, a trainee was selected to attend the course to help launch a program to use about 10,000 seasonal tanks for aquaculture that are used only for retention of water irrigation programs.

> I learned modern techniques of breeding and rearing Chinese carps. Upon my return I was assigned a number of fish seed production ponds and given a target to achieve. From the training I realized the importance of vigilance of water management, nutrition, etc. to attain good growth and survival rates of fish seed.

Another Sri Lankan from an Inland Fisheries Station said he was able to apply his training in an IDRC-supported project on "Cage Culture" to produce fry and fingerlings. He is the project officer of the project in his station.

After returning from RLCC's Carp Seed Production course, two Malaysian assistant fisheries officers found their China training useful. They have successfully applied the technique of induced spawning of Chinese carps at their breeding and fry production station, the Bukit Tinggi Freshwater Fisheries Center.

Staff Development. Three RLCC and FFRC staff members received PRA fellowships. Zhang Laifa completed a visiting scientist attachment at Auburn University, Georgia, USA, and is now a researcher involved in an AFNS/FI-supported project on biological models of the high-yielding integrated fish farming in China. Another staff member, Miao Wei-Min, earned an M.Aq. at the UPV-SEAFDEC-AQD senior aquaculturist course in the Philippines. He is now a full-time teacher in the Integrated Fish Farming Training course. A third staff member, Li Hui, was funded to attend the short-term Fish Genetics Training program at the National University of Singapore. He is now on a World Bank-funded Ph.D. program in the U.S., and will be a valuable addition to the research and training program of RLCC and FFRC when he returns.

Research. AFNS/FI has been actively involved in the initial as well as the developmental and implementation stages of the IDRC training project at RLCC. Through the training project, AFNS/FI got to know RLCC better and provided ideas and suggestions on how to interrelate the training and research activities. It was not until the second year of the FAD-supported training project that AFNS/FI officially started a research project related to integrated fish farming at RLCC's mother unit, FFRC. Experience and data from two projects (Fish Farm Survey and the Bio-Economic Modelling on Integrated Fish Farming) (in collaboration with NACA and the Chinese government) will undoubtedly enrich and strenghthen the integrated fish farming training course.

In addition, the Chinese have been conducting their own research related to freshwater aquaculture and integrated fish farming. These studies were reported recently in a publication entitled "Selected Papers of Freshwater Fisheries Research Center, Chinese Academy of Fisheries Sciences" (Wuxi, China, 1987). Among the twelve studies listed in this publication were "Study on Sources of Fish Growth in Manured Fish Ponds as Indicated by Delta C Analysis"; "Studies on Effect of Fish Farming with Biogas Slurry"; "Production of the Dissolved Oxygen in Fish Ponds"; "Studies on the Ecological Effects of Varying the Size of Fish Ponds Loaded with Manures and Feeds."

The kind of cooperation between the two IDRC divisions with two outside donors and the host country in one institution is a desirable model in capacity building for training and research.

Summary

FAD and AFNS/FI came into RLCC when its international training program was in its third year. The physical infrastructure, manpower resources, and training/research programs were already in place. Thus, FAD funds went mainly to support trainees. A small portion of the funds were used to strengthen RLCC's training equipment. An additional incentive was that IDRC could link directly with RLCC instead of going through a more cumbersome third party, e.g., NACA or UNDP/FAO.

Despite some administrative activities that RLCC could not directly perform (e.g., participant's airfare ticketing) because of government restrictions, the direct donor-recipient relationship increased RLCC's capability in dealing with participants' financial and other needs in China, and in preparing narrative and financial reports. More importantly, the direct relationship promoted mutual appreciation and understanding of the training program's needs.

The entry of FAD and AFNS/FI strengthened both the training and research programs of RLCC. For example:

- the number and country/regional origins of participants expanded. As a result, RLCC's program became viable and recognized by other donors and countries outside Asia;
- research and training support provided by FAD and AFNS/FI upgraded the expertise of some RLCC staff.

The effectiveness of the RLCC course is supported by the positive testimonies of trainees who specified what knowledge and skills they learned as well as the applicability/adaptability of the Chinese technology in their

environment. The impact of these trainees in their institutions' research and development program may be premature to assess at this time but there is no doubt about the positive impact of the training course on these participants as individuals.

There are some administrative and substantive areas that could be further strengthened, and will require continuing presence of IDRC. For example:

- There is a need to upgrade RLCC's institutional and administrative staff.
- The instructional materials and teaching equipment should be continually improved to increase the course's responsiveness to a wide variety of individual needs.
- A systematic followup of former participants could provide useful data that could be used to improve the course's content and teaching strategies. An accumulation of such data could also be a strong indication of the technology's adaptability/ applicability in other developing countries. Over a period of years, such data can indicate the impact of the training program on recipient institutions.
- In the future, new research results and technology developed from the research at RLCC (supported by AFNS/FI) will be fed into the training program to keep it up-to-date as aquaculture is in a dynamic expanding state in China and the region as a whole.

Case 2: Faculty of Economics and Management (FEM) (formerly Resource Economics and Agribusiness), Universiti Pertanian Malaysia, Serdang, Malaysia (UPM)

Background

This was FAD's first attempt to implement the T-T scheme. FAD support to UPM as a trainer institution in fisheries economics (M.Sc.) had been associated with the project of the Social Sciences Division (SSD) called "Asian Fisheries Social Science Research Network" (AFSSRN). From 1982 to 1987 the network was composed of nine institutions in four Southeast Asian countries: UPM; Kasetsart University (KU), Thailand; University of the Philippines in Los Banos (UPLB); Universiti Diponegoro (UNDIP) in Indonesia; Department of Fisheries, Thailand; Center for Agro Economic Research (CAER), Agency for Agricultural Research and Development (AARD), Indonesia; SEAFDEC-AQD; ICLARM (International Center for Living Aquatic Resources Management). CAER and UPLB withdrew their memberships and new members replaced them in 1987: Central Fisheries Research Institute and Agro-Ecosystems Research Group (KEPAS) both of AARD, Indonesia; and the Bureau of Fisheries and Aquatic Resources (BFAR), the Philippines. One of AFSSRN's objectives was to develop a group of well-trained fisheries social scientists. IDRC's support was an effort to encourage national research capability to address important socio-economic issues in fisheries and aquaculture development in the Southeast Asian region. This research and training support (from SSD, AFNS/AEP, AFNS/FI, and FAD) has had three phases already.

Program and Resources of Trainer Institution. The M.Sc. degree program in fisheries economics started in 1981 through the encouragement of the SSD. The first group of eight students from four countries came in 1983. The degree program requires a 2-month pre-M.Sc. program in economics (at first offered at UPLB but later transferred to UPM), a year of courses at UPM, and another year of thesis research in the student's home country.

UPM has a modern, well-equipped campus of 1200 hectares in Serdang, 23 kilometers outside Kuala Lumpur. Its neighbouring units are MARDI (Malaysian Agricultural Research and Development Institute); Universiti Kebangsaan Malaysia; Agricultural Institute and Federal Experimental Station of the Department of Agriculture; Palm Oil Research Institute of Nuclear Energy Unit; and staff training and development centres of several public and private institutions.

The Natural Resource Economics Department has 12 faculty members with graduate degrees. Six of these (two Ph.D.s and four M.Sc.s) are directly involved in the M.Sc. fisheries economics program. There are two other faculty members (Ishak Omar and Nik Mustapha) now doing Ph.D. work in the U.K. and the U.S. and they expected to finish in 1988. With the expected return of Messrs Omar and Mustapha, two faculty members plan to go for Ph.D.s with partial FAD support: Tai Shzee Yew to Simon Fraser University, British Columbia, Canada, and Kuperan Viswanathan to the University of Rhode Island, in the USA. The pool of fisheries economics program supervisors and lecturers is beefed up by the senior faculty members of the Department of Economics, Department of Agricultural Economics, and the Faculty of Fisheries. There are currently eight of these senior teachers from the other departments serving as thesis supervisors (each student has three supervisors) of fisheries economics students.

A recent development that should increase and enrich departmental collaboration in fisheries at UPM is the FAD identification of the Faculty of Fisheries as a regional center for research and training in fish diseases. For example, there is a proposal that the third supervisor of every fisheries economics graduate student should be from the Faculty of Fisheries. Hopefully, some research projects of this new center will include economic aspects in collaboration with some faculty members of the Department of Resource Economics.

The research program of the Department of Natural Resource Economics is mostly related to projects of the AFSSRN. The specific areas of the program are: capture fisheries (marine), aquaculture (small-scale fishponds), and

marketing. As part of the AFSSRN group, the Department has been conducting studies on production and marketing systems of capture fisheries; marketing of cultured fish production; marketing and distribution of the fry and fingerling industry; management of capture fisheries; and integrated fish farming. In addition, the UPM Department has developed a national networking relationship with the government's Department of Fisheries in Peninsula, Malaysia, Sabah, and Sarawak; and with the Malaysian Fisheries Development Authority (LKIM).

Process

Entry of FAD. FAD's initial support (1982) went to ICLARM in the form of pre-project awards for staff of AFSSRN member institutions to pursue M.Sc. degrees at UPM. The agreed arrangement was for FAD to fund the first year of the course work, whereas the second year of thesis research would be paid by the budget of the research project of SSD in AFSSRN institutions being administered by ICLARM. To avoid this round-about process and a lot of work because of individual awards, and knowing SSD's long-term interest in the network, FAD explored with SSD and ICLARM the possibility of a direct institutional grant to UPM .

Discussions and Negotiations. With SSD's agreement, FAD sent the Vice-Chancellor of UPM, an exploratory letter. The idea of direct longer term support for the M.Sc. program was well recieved by the Vice-Chancellor during a visit in early August 1983. With his encouragement, FAD, AFNS/AEP, and ICLARM's representative at UPM met with the Dean of FEM and his staff. Discussion centered on the possible components of the program (e.g., M.Sc. plus 5-week non-degree) and the institutional coverage of the target clientele (e.g., staff within the network members plus personnel from the relevant Malaysian government departments).

The Malaysians felt that personnel from their relevant government departments should be included.

AFNS/AEP was especially concerned that the 5-week non-degree UPM economics course for non-economists did not duplicate the pre-M.Sc. summer economics course offered by UPLB. ICLARM opposed the idea of a two-tier 5-week summer program at UPM composed of M.Sc. candidates and participants who are non-economists. He felt that it would be difficult to meet the needs of the two groups in the same program given their different backgrounds.

In addition to the M.Sc. and non-degree components of the training program, there was discussion about partial FAD support to upgrade some UPM-Resource Economics staff members. The need was training for more Ph.D.s. UPM had a faculty development plan and the FAD contribution for staff upgrading excluded the usual benefits and entitlements given by UPM to faculty members on study leave. As to the logistics of administering the proposed M.Sc. program at UPM, a coordinator from FEM was to be designated. The process of receiving applications and selection was to follow what was already in place.

The proposal sent by UPM to FAD conformed to the substance of the earlier discussions. There was a delay in the processing of the proposal because of the objection of ICLARM to having UPM directly administer the project. As coordinator of the AFSSRN, ICLARM officials felt FAD funding should go through them, as had been the case of SSD project support to the AFSSRN. FAD argued that the institution offering and implementing the course should be the direct recipient of IDRC funds to develop not only its administrative capability but also its reputation as a regional center for fisheries economics. Unlike RLCC, UPM had the administrative capability of handling all the budget items of the project: international airfares, visas, student allowances, etc. The differences were finally resolved when both SSD and FAD agreed to make UPM the recipient. Project implementation started in the 1985 session.

As a result of the decision to make UPM the direct recipient of IDRC funding, the active role of coordination shifted from ICLARM to UPM. It was the duty of the UPM coordinator to work cooperatively with ICLARM and the AFSSRN institutions to identify qualified candidates and to process

applications. As it turned out, the weakness of the coordination aspect of the program was not so much because direct funding shifted from ICLARM to UPM but because the UPM coordinator had difficulty in finding the time to travel and to do effective liaison work with ICLARM and AFSSRN officials. As a result, the number and quality of applicants from client institutions during the first 2 years were small and weak. There was uncertainty on the part of the sending institutions in employing the graduates from the M.Sc. course.

MGC. Due to budgetary limitations, only the M.Sc. and the partial staff development components were covered in the project budget. Under its "institutional development" category of support, FAD committed itself to a 3-year project that would train a total of 12 M.Sc.s and one Ph.D. from FEM's staff. The non-degree programs (5-month and 5-week) were to be considered under the other FAD mechanism of support (e.g., PRA and Group Training).

Phase II. Realizing the continuing need of AFSSRN institutions for more technically trained economists and for UPM to develop as a strong regional training centre in the fisheries economics area, FAD decided to go for a second phase. This decision was made despite an earlier evaluation of the first phase showing deficiences in coordination, the thin pool of quality candidates from AFSSRN institutions, and the inability of one member institution to employ the graduates from the program.

Another reason for the decision to extend the support was the SSD-ERD's decision to go for Phase III support of the network. In recommending this additional phase, the SSD program officer felt that despite the "failings in commitment and resources" of some network members, "less than effective networking strategies," and "imperfect identification of research priorities and results dissemination activities," AFSSRN "still represents the best, if not the only way, to foster research on fisheries resource, management issues in ASEAN countries." The response to provide further support was therefore a recoignition of the reality that the task of developing institutional capacity requires long-term commitment.

In the second phase, UPM promised to remedy these deficiences. The new project aimed to continue the funding of three thesis students who started under Phase I plus three more new candidates for both course and thesis work. In addition, the project will support two Ph.D. candidates from UPM's resource economics faculty.

Monitoring. The first monitoring visit was made in October 1984. This was prompted by pressure to get UPM to sub-contract the pre-M.Sc. summer economics course at UPLB to ICLARM. FAD's position was that UPM should negotiate the contract directly with UPLB as part of the project's objective to develop UPM's administrative capability. FAD introduced the UPM coordinator to UPLB. Also on this visit, there was talk about the possibility of UPM itself offering the pre-M.Sc. economics course.

The UPM coordinator met the new chairman of UPLB's Agricultural Economics Department, the unit handling the pre-M.Sc. summer economics course. The tuition fee for the summer course had more than doubled from the previous year, 1984. Moreover, the UPM coordinator was concerned that the pre-M.Sc. students who got good grades at UPLB did not do as well at UPM. He suspected some mismatch in the UPLB summer course and the UPM regular course. These problems prompted UPM to more seriously consider offering the pre M.Sc. economics course, a plan that materialized in 1986.

In another visit in January 1986, FAD raised two main issues with UPM. The first was on the quality of candidates from AFSSRN institutions. One candidate from Thailand had to quit after the first semester because of failing grades. The problem was related to the adequacy of good candidates from member institutions and the selection process of UPM. One candidate from the 1984 group dropped out after the summer course in UPLB. The second issue was the commitment of the sending institutions to employ the students after completing the M.Sc. Kasetsart University, for example, recommended candidates but did not have a place for them afterwards. These procedural problems were later remedied -- applications from institutions were requested much earlier to allow better screening of candidates, and a statement from institutions to guarantee employment after graduation was required.

AFSSRN - Phase III. In an effort to improve the coordination and cooperation between research and training within the network members, a Team Leaders meeting was held on 15-16 February 1988 at UPM. At the meeting, the training committee of the network reported on the guidelines for their own short courses planned within Phase III of the project. It is not clear if this same committee planned to expand its role to include an advisory function in UPM's M.Sc. course. If this added role were made possible, the member institutions in the AFSSRN would have direct inputs into the identification of candidates and selection criteria of the UPM Masters course. The direct communication between UPM and the network's training committee would be one way of improving coordination.

In Phase III, there has been greater collaboration among AFNS/FI, AFNS/AEP, and FAD. This increased inter-divisional collaboration can be used as a positive leverage to help UPM become a strong and reputable regional center for training in fisheries economics.

Impact

The M.Sc. Course. Five graduates from the FAD-supported group of trainees are probably not large enough to assess real impact. After the 1985 and 1986 awards were made, FAD commissioned a review of the objectives, process, and impact of the 1984 project.

The review was done by Pastor Torres in October 1986. In his report, Torres summarized his findings as follows:

(1). A total of 22 applications were received for the two rounds of awards. From this figure, four FAD fellowships were awarded each year for a total of eight — Thailand 2; Indonesia 3; Malaysia 3; the Philippines 1. Of these eight, one candidate withdrew and another failed after one semester. Three of the students were from institutions outside the AFSSRN network. These statistics revealed the major weakness of the project: there was an insufficient pool of strong candidates from a majority of the members of the

AFSSRN. To enable the program to become self-reliant in the future, UPM should consider taking in candidates from outside Southeast Asia. Already there have been applications from Senegal and India that should be encouraged and considered.

(2). In the group of eight, three had no assurance of being employed by the sending institutions.

Since the regional fisheries economics degree program began in 1981, there have been eight graduates. Of these, five were FAD-supported through various mechanisms. Three of the five have returned and served their home institutions: trainees from UNDIP, Kasetsart, and Kelantan. Two Thais could not find positions in Kasetsart. They found jobs in other places: one teaches economics at Prince of Songkhla University, and the other is employed by the Bangkok Bank. The following testimonies were given by two of the graduates through the questionnaire:

On the value of the M.Sc. course, a trainee from UNDIP says:

> The training increased my skill in fisheries/aquaculture economics research. In 1986-1988, I was posted to be a project leader of 3 fisheries/aquaculture research projects. These research projects will contribute significantly in UNDIP's main scientific orientation which is coastal development. I am also the secretary of the UNDIP team in AFSSRN.

Another graduate of the UPM course responded by saying:

> I learned theory of fisheries and aquaculture management and I think

> it is just an introduction rather than a specialist course. The course should give more concern to multi-species fishery management and some field trips rather than full lecturing. The training improved my ability in economic analysis through computer program.

This trainee commented that she could not find a position at Kasetsart after she earned her M.Sc. and she is now a lecturer at Prince of Songkhla University in fisheries economics for undergraduate aquatic science students. She is doing research on alternative policies for aquatic resource management in Lake Songkhla basin, supported by IDRC.

There are nine more FAD-funded scholars who are either working on their thesis (six) or course work (three). This group appeared to be better than the earlier group. For example, during a meeting with seven of these scholars in April 1988, the two Indonesians who were in their thesis writing stage were more articulate in English. They were expected to finish in mid-1988 as were the two Malaysians.

For the 1988 group, 15 applications were received and five were chosen for admission: two from Indonesia; one each from the Philippines, Thailand, and Malaysia. UPM officials (the Dean, the Deputy Dean, and the Natural Resource Economics Department Chairman) were unanimous in saying that the candidates during the last two years have been much better than the previous ones. AFNS/AEP confirmed this observation in his 19 February 1988 report to his colleagues in ASRO after returning from an AFSSRN Team Leaders meeting at UPM.

The Short Course on "Fisheries Economics for Non-Economists." Taking advantage of available resources at UPM and responding to the need of exposing fisheries scientists to the economics of fisheries, FAD supported two sessions of the 1-month course through its group training mechanism. The first was

from 14 May to 15 June 1984; the second from 24 June to 20 July 1985. The 25 participants (12 in 1984, 13 in 1985) were from IDRC-related institutions in Southeast and South Asia.

From some participants who responded to the questionnaire were the following testimonies about the usefulness of the course. A trainee from the Farming Systems Research Institute of Thailand's Department of Agriculture says:

> "Previously, my research findings showed agronomic data only; after training I can show both agronomic and economic data that can be useful in the farmer's adoption of the technology. My institute has no economist. So I was chosen to attend the training. I am able to transfer the knowledge to FSRI staff and present a report for the annual FSRI seminar."

A trainee from the Fisheries Development Authority of Malaysia (LKIM) reports the following:

> "To me, the most important topics I learned were the aspects of project preparation and analysis and profit maximization principles. These have made my job much easier and meaningful. My work deals with project planning, implementation, and monitoring. Since I returned from the course, I was given the task to prepare few multi-million project papers in aquaculture. These projects are performing satisfactorily. Now I am in the process of preparing project paper for a Fish Processing

> factory to be launched before end of 1988. I am now Assistant Coordinator for the Upgrading Program of The Fish Processing Industry with LKIM."

A fisheries officer in the Department of Fisheries in Kuala Lumpur said that the most useful knowledge and skills he learned from the Fisheries Economics course were the computation and application of economic indicators that he taught to his staff who were involved in doing aquaculture feasibility studies.

The deputy director in the government's Fisheries Development Authority in Kuala Lumpur clearly describes the benefits he got from the course as follows:

> "Prior to the course, I was not sure what project feasibility or project viability means because I was basically a trained biologist. Now I am able to understand the meaning of symbols like CPM, IRR, etc. My job requires me to plan, implement and monitor aquaculture projects and to be knowledgeable in both biology and economics. Now I am able to write my own project proposal complete with detailed cash flow analysis--something I was unable to do before.

Problems

Aside from the problems related to lack of an adequate pool of strong candidates from the participating institutions, there were deficiencies in coordination and administration.

(1). Despite an available travel budget, the coordinator did not play an active role in the identification of prospective students. This function was left mainly to the home institution. There were reasons for this. For example, UPM's coordinator did not have an official appointment as such. His informal designation as coordinator would not count for promotion. Moreover, the coordination task was without compensation and was an addition to his full-time assignment as lecturer and researcher. In short, the job carried no incentive. This "no incentive" factor further affected the quality of interaction between the member institutions and the UPM-based coordinator. For example, there were four meetings of network Team Leaders. Although these meetings were held to discuss research, such events could have been a good opportunity to meet the network leaders and to discuss the training program.

(2). Some students complained of a few delays in the handing out of their monthly stipend as well as some small differences in stipends provided by other donors.

(3). Thesis supervision was another problem. Thesis supervisors took a passive attitude about their advisees, thus accounting for the delay in the completion. For example, none of the students had thus far completed the thesis research within the period of 1 year. Supervisors expected their students to report to them during the period of their research in their home country. In fairness to the supervisors, there were no provisions for them to travel to their advisees' home countries.

(4). The current batch of awardees at UPM complained of insufficient book allowances and thesis typing support. Library books and journals on fisheries economics were inadequate. They also hoped that UPM would consider separate dormitory accommodation between undergraduate and graduate students.

(5). The tendency of students to take more time than necessary in data gathering at home has been pinpointed as the cause of delay in thesis completion.

Problems are to be expected, especially in the early stages of the program. Some of these have been remedied. For example, the nominating or recommending institution was required to attach a statement of employment guarantee to the candidate's application. Without this statement, the candidate could not be considered in the screening process. To improve coordination, UPM gave an appointment to the coordinator that carried an honorarium. Regarding delays in thesis completion, UPM has informed the students of the three months' time limitation to complete their data gathering activities. A budget was also provided for each supervisor to travel to his advisee's home country during the latter's data gathering work. The other administrative problems, like delays in allowances and dormitory accommodation, were brought to the attention of the UPM coordinator.

Some situations will take some time to improve. For example, Indonesian institutions in the network could not be compared to those in the other countries. In general, the level of competence in English and the quality of undergraduate training in Indonesia are behind those of the Philippines and Malaysia, and even of Thailand. The claim that the recent groups of candidates are better than the earlier ones has to be proven by performance.

The prospects for a better program in the future is indicated by the improvement in the qualifications of the faculty through the Ph.D. program abroad. The linkage and closer cooperation with the Faculty of Fisheries in training and research is another happy development that interrelates the natural science and social science aspects of fisheries.

Summary

Universiti Pertanian Malaysia's (UPM) Faculty of Economics and Management (FEM) is a member of the Asian Fisheries Social Science Research Network (AFSSRN). Composed of nine Southeast Asian institutions, AFSSRN's objective is to encourage national research capability to address important socio-economic issues in fisheries and aquaculture development in the region.

One approach to achieve AFSSRN's manpower development objective is the 2-year M.Sc. Fisheries Economics offered by the FEM of UPM with FAD support. The research projects of the network have been receiving support from three other units of IDRC (SSD/Economics, AFNS/AEP, AFNS/FI). Thus, the AFSSRN and UPM programs illustrate another effort at collaboration between IDRC units and a group of important national institutions.

The first four years (1983-87) of FAD support in the M.Sc. course produced five graduates. Three of these returned to their home institutions; two could not be hired by the nominating university. This weak performance was due to procedural and coordination problems.

Procedural and coordination problems encountered during the first 4 years of the project were remedied in the next phase of the project. Nominating institutions were required to attach a statement guaranteeing employment to successful candidates. The UPM coordinator was officially designated as such with an honorarium. Likewise, the students' thesis supervisors were provided travel funds to visit their advisees. Data gathering for theses was limited to 3 months.

To promote and further strengthen UPM's M.Sc. fisheries economics course, its intake of students should expand beyond the Southeast Asian region. Institutions in other regions, especially South and East Asia, should be made aware of the program and invited to send candidates.

To complement the M.Sc. course and to respond to the needs of fisheries scientists, UPM conducted two 1-month economics courses for non-economists. The feedback from participants described valuable and applicable principles and skills in economics gained from the course.

Case 3: SEAFDEC-Aquaculture Department (AQD), Tigbauan, Iloilo, the Philippines

Background

The Aquaculture Department (AQD) was formally established in 1973 as one of the three departments of the Southeast Asian Fisheries Development Centre (SEAFDEC). Founded in 1968, SEAFDEC-AQD is an international research and development organization devoted to accelerating the development of aquaculture technology in the region under an agreement among Thailand, Malaysia, the Philippines, Vietnam, Singapore, and Japan. The two other departments of SEAFDEC are the training department in Thailand and the marine fisheries research department in Singapore.

SEAFDEC-AQD is headed by a chief. It operates three major research stations and six sub-stations. The main research station and headquarters are in Tigbauan, Iloilo. The Leganes (Iloilo province) station emphasizes pond research and verification studies; the Binangonan (Rizal province) station does research on freshwater aquaculture. Fish broodstock and breeding studies are conducted in the sub-station in Igang, Guimaras, Iloilo, while prawn maturation and breeding research is done at Batan, Aklan province.

In addition to its main function of promoting and undertaking research in aquaculture, the AQD has training and information dissemination programs.

IDRC, through its AFNS/FI program, has been providing research support to AQD since 1975. This support has concentrated in milkfish research. As a result, AQD has made significant breakthroughs in milkfish breeding to remedy the seasonal shortage of fry experienced by fishpond operators. Milkfish farming is a very important industry that contributes 91% of the total production of the aquaculture sector in the Philippines. In addition, IDRC's Information Sciences division has a complementary project in AQD on brackishwater aquaculture information systems (BRAIS).

In May 1983, FAD was introduced by AFNS/FI to AQD's training division. Five months after this initial discussion, a training proposal was submitted by AQD for FAD's consideration. In January 1985, a 2-year training project was approved to support trainees in four regional short-term courses (ranging from 1 to 2 months' duration): Hatchery of Marine Fisheries; Freshwater Aquaculture; Brackishwater Pond Culture; and Depuration/Seed Production of Oysters and Mussels.

Trainer Institution

In his report on "Aquaculture Training Needs in Developing Asia," the NACA Project Coordinator in Tigbauan referred to SEAFDEC-AQD as "one of the largest and best equipped aquaculture institutions in Asia." Its professional and support staff had grown to 669 in 1985 from an initial 30 in 1973. Of this total, 379 were in research, including 10 Ph.D.s and 64 M.Sc.s. The great majority of these Ph.D.s and M.Sc.s received their degrees through AQD's staff development program (many funded by AFNS/FI).

When FAD developed its first training project at AQD in 1983, its training division was already offering several national short-term courses in Hatchery and Cage Culture of Tilapia; Small-Scale Prawn Hatchery and Nursery Operation; and Brackishwater Pond Culture of Milkfish, Prawn, and Tilapia. In addition, a 1-year international Master of Aquaculture degree program had been offered since 1980 in collaboration with NACA and U.P. Visayas. By 1985, AQD's training division had conducted 20 different types of short-term national training programs and 19 international training courses in various topics of aquaculture. These courses produced a total of 8395 trained individuals.

AQD is one institution with adequate field and laboratory facilities to train aquaculture personnel for the region. The Tigbauan main station is a 40-hectare research complex. The complex has four buildings for offices, classrooms, laboratories; staff housing; dormitories, cafeteria and sports facilities; a wet laboratory; indoor hatchery tanks; and a library and

computers. The Leganes Research Station is a 96- hectare pond system that includes buildings for administrative, laboratory, and training purposes. Comparable facilities are found at the Binangonan Research Station.

Process

Exploration. On FAD's first visit in 1983, there was no doubt about the adequacy and quality of the infrastructure and manpower for research and training of AQD. The main concerns were internal politics and leadership stability. The staff were polarized into factions; ambitious scientists were actively fighting for the top position that became available every 2 years; and relationships between local and foreign personnel needed much improvement. FAD was therefore cautious in moving to develop formal collaboration for training. More specifically, FAD waited for developments in the leadership problem of the training division where the director was planning to resign.

Negotiation. While FAD maintained a "wait and see" attitude on AQD, AFNS/FI and FAD agreed to "buy places" on an individual fellowship basis in NACA's 1 year M.Aq. degree program for senior aquaculturists. Seven slots were contracted to AQD in the 1984 session from the PRA budget.

Five months after the first visit, AQD sent a proposal entitled "Five-Year Manpower Training and Development Program 1984-1988)." It was a staff development proposal, quite different from the expected regional training courses to be offered by AQD. FAD and AFNS/FI conveyed a common position: to see the development and implementation of international training programs for researchers in aquaculture plus some staff development support, primarily to strengthen these training programs. AQD agreed to this position in principle.

Another visit was made in March 1984. By now, the training division had a new head. The AQD chief was struggling to keep his position for another 2 years. On this visit, FAD explained its Selective T-T Scheme and the possible role of AQD. In preparation for that visit, the new training

division head prepared a Three-Year Training Program to be conducted by AQD. The total cost of the proposed program was USD 2,751,600 to be contributed by three agencies: IDRC (USD 409,300); JICA (USD 393,200); AQD (USD 1,949,100). There were 12 short-term courses listed for offering.

The proposal was brought back to Singapore for consultation with AFNS/FI and AFNS/AEP. FAD needed their suggestions as to which courses were closely linked to their research interest. The length, content, or coverage of the courses, and how to respond to the staff development and equipment components in the proposal were also discussed. FAD's plan was to use its "institutional support" mechanism within which three types of activities could be included: international training of scientists, staff fellowships, and some equipment related to training.

AFNS/FI picked out four of the courses from AQD's list for FAD funding, based on the assessed capabilities of AQD as a quality trainer institution and the needs of trainees related to IDRC support in the region. These were: Hatchery of Marine Finfishes; Depuration and Seed Production of Oysters and Mussels; Freshwater Aquaculture; and Brackishwater Pond Culture. FAD negotiated the final details in November 1984 and a 2-year program (under "institutional development") was approved by the Centre in January 1985 for CAD 268,260 to train a total of 48 scientists in the four areas of aquaculture. One other course on aquaculture for social scientists was recommended by AFNS/AEP to be funded via the group training mechanism. The participants to this one time offering were drawn from the AFSSRN member institutions, especially those taking the UPM M.Sc. fisheries economic course.

Monitoring. Concern for improving the format and content of existing training handbooks led to a 5-day workshop in February 1985. The workshop was on techniques of developing and producing self-instruuctional modules on selected aspects of aquaculture technology. Twenty AQD research and training staff members attended the workshop. The workshop participants produced a booklet of self-instructional modules from sections of their old "Handbook on Brackishwater Pond Culture." The pre-workshop and the post-workshop sections

from the old handbook were laid out side by side to illustrate the improvements made using educational technology.

Another visit was made in September 1985 to coincide with two on-going courses (Brackishwater Pond Culture in Tigbauan and Freshwater Aquaculture in Binangonan). The planning and implementation of the Tigbauan course were hampered by disruptive pickets and demonstrations against the administration for alleged anomalies. Some course participants complained about too many lectures and less practical exercises. Uncooperative researchers did not want their field sites to be used by the trainees for practicals. We discussed ways and means of institutionalizing the participation of researchers in the training program. For example, consideration was given to providing honoraria and giving credit for a researcher's involvement in training in AQD's staff performance assessment. Observations from that visit were conveyed confidentially in a 4-page letter to the AQD chief.

In addition to on-site visits, FAD did its own questionnaire followup (in December 1985) of former participants to assess their satisfaction with the training arrangements and the usefulness of the courses. The data from these followup visits were shared with AQD, who took steps to remedy the deficiencies and weaknesses expressed by former trainees.

With the political change in the Philippines in February 1986, the pro-Marcos leadership in AQD had to go. Included in this was the head of the training division. The volatile political situation and the drastic reorganization prompted FAD's recommendation for IDRC to maintain a "wait-and-see" attitude as regards future support. The new leadership decided to continue with the on-going training programs with the appointment of a new director to the training job.

Impact

Research. FAD's entry in AQD came after 10 years of research support from AFNS/FI. This support in the first 10 years concentrated on milkfish.

This sustained funding on milkfish paid off very significantly. There was an important breakthrough in the breeding of milkfish caught from the wild as well as those raised in tanks. The technology of milkfish reproduction became key to the success in breeding of other captured finfishes such as seabass, siganid, and grouper. The training director summarized the breakthrough and the significance of the AFNS/FI contribution as resulting from "rigorous scientific study through the provision in the projects of equipment and sophisticated training of research staff."

FAD's support for training was therefore a logical outgrowth of the research that had matured and had produced an important technology for dissemination.

AFNS/FI continues to collaborate with AQD through a network of projects in other topic areas related to its previous emphasis: Fish Gametes, and Fish Genetics Network. Others in the pipeline are Fish Health and Fish Nutrition.

Training. FAD's support from 1985-1987 in the four short-term courses yielded 63 trained aquaculturists and technicians. This number is more than the original 48 because some slots for international participants in the Hatchery of Marine Finfishes course were replaced by staff members from BFAR where AFNS/FI is promoting a National Bangus Breeding Program. The breakdown of FAD-funded trainees in each of the four courses is as follows: Hatchery of Marine Finfishes (29); Brackishwater Pond Culture (17); Freshwater Aquaculture (8); Depuration and Hatchery/Culture and Sanitation of Bivalves (9).

In addition, there were 12 social scientists (mostly M.Scs. from UPM) who took the 1-month course on "Aquaculture for Social Scientists." Also through FAD's PRA and Group Training mechanisms, a total of 15 trainees took the NACA-AQD-UPV M.Aq. degree program for senior aquaculturists.

Responses of former grantees in the "Hatchery of Marine Finfishes" group range from "very successful" to "less successful" application of training knowledge and skills. The quality of institutional encouragement and support to returning trainees is the main factor in the extent of

knowledge/skills application. Here are some testimonies illustrating the importance of home recognition of the trainees' training. This recognition comes mainly in the form of incentives such as upgraded positions and monetary remuneration or being assigned to a job where the trainee can directly apply the knowledge and skills gained from training. There was negative feedback explaining why trainees were not able to apply fully what was learned because of changes in institutional program priorities.

One of the trainees is assigned to the Sichang Marine Science Research and Training Station of Chulalongkorn University. Although the training course he attended was on hatchery of finfishes, the knowledge and skills he learned have been applicable to other marine species, for example, rabbit fish and molluscs (oysters, mussels, and scallops). He did two successful studies immediately after training: "Effect of Different Stocking Densities on Growth of Juvenile Rabbit Fish (Siganus guttatus) fed with Commercial Chicken Pellets in Floating Net Cage" and "Breeding and Larval Rearing of the Rabbit Fish." He said:

> "Now, my director encourages me to further study the scallop culture after my preliminary success of this but there is no fund for the operation including supporting the further training of mollusc culture."

An Indonesian trainee stayed on for 7 months with his institution after training. He was able to use his skills in seabass breeding and larval rearing. In order to prepare him more technically for a new project on seabass breeding, his government sent him to pursue a M.Sc. in marine biology at the University of the Philippines in Diliman.

The problems of the returning participants were not in the usefulness of knowledge and skills learned during the training but rather in the jobs they were assigned within their home institutions. With the current

popularity and priority of prawn farming, many returning trainees were asked to engage in the production of this species.

A trainee from the Phuket Brackishwater Fisheries Station, for example, was sent to SEAFDEC-AQD with specific instructions to concentrate on prawn although the course was on general brackishwater aquaculture. On his return from training, he worked on "suitable age and size of cultured tiger prawn in pond for brood stock"; "nursing P. monodon from P10 to P45 through feeding with pellet compared with horse mussel meat in earthen pond".

Two Filipino participants also attended the brackishwater aquaculture course but their real interests were only in prawn. Both were technical supervisors and partners of prawn farms. One trainee from the Brackishwater Aquaculture Development Center of Indonesia devoted her time to shrimp seed production. She has not been given any opportunity to do research since her return from training.

There were also those who were very happy not only with what they have learned but also with their jobs at home. A Kiribati government fisheries officer found the "full package of pond technology" valuable and the "papers from individual units of AQD which have become permanent reference to me." On fry handling, he said:

> "The fry we use to stock our ponds come from the outer islands. Before we used open tubs to transport the fry. Now we are transporting in oxygenated plastic bags. There are no dead fry on arrival at ponds whereas before about 10-20% dead were found when we open the tubs used."

He is involved in some research projects: "Production Economics of Tarawa Seaweed Private Farm," which looks into this important "cottage industry involving the majority of unemployed people in Kiribati," and "Mullet Culture

for Bait," which is an attempt to augment the lack of live bait for pole-and-line fishing.

An Indian scientist from the Brackishwater Fish Farm of CIFE, an ICAR station, already possessed a good background in fish research, but he profited very much from what was taught and the field visits to private fish farms. He described the value of the course as follows:

> "After return from training, milkfish production at our farm was doubled by resorting to the methods learned at SEAFDEC-Leganes. I was allowed to follow the program and techniques I learned in raising milkfish culture."

A fisheries officer in the Brackishwater Research Center in Johore, Malaysia listed three main skills he learned from the course: techniques of pond culture, techniques of site surveys, and methods of economic feasibility studies in aquaculture.

Another brackishwater aquaculture participant is a farm manager of a shrimp farm of Andriesz Mariculture Co. Ltd. of Sri Lanka. He said:

> "Remarkable improvement in production through the application of knowledge from the course. Earlier production was 14,000 kg./ha./year. Now 18,000 kg./ha./year. I was given importance upon my return by letting me take over the management of the farm from a Taiwanese expert. Also free housing, good salary, a vehicle."

Another Sri Lankan from the Ministry of Fisheries is engaged in extension work.

> "I worked with fish farmers and got very good success in their pond operations. Training helped me gain confidence. The methods I learned are easily applicable to local conditions and are accepted by fish farmers."

A trainee from the South China Sea Fisheries Research Institute in Guangzhou was able to apply his knowledge in a variety of research topics: mullet reproduction and larval rearing; and two shrimp species: P. merguiensis and P. orientalis.

Two trainees from the Freshwater Aquaculture course returned the mailed questionnaire. A trainee from the College of Fisheries, Mindanao State University, did not have an opportunity to apply his training at home because he left to pursue an M.Sc. in Aquaculture at Central Luzon State University.

A Sri Lankan trainee had a positive experience at Binangonan Station of SEAFDEC. On his return from training, he worked on cage culture projects supported by AFNS/FI. He tested different stocking densities and different diets of Sarotheradon niloticus. (No one responded from among the oyster and mussel group of trainees.)

The M.Aq. degree course is a generalist course and a collaborative program involving AQD, UPV, and NACA. The course utilizes most of the personnel and facilities of AQD. In fact the program is physically based there. The course includes a study tour of other lead centres of NACA, i.e., China, Thailand, and India.

Many of the respondents from this course are in managerial positions that were just what the training had hoped to achieve.

A trainee from the Directorate General of Fisheries, Indonesia, worked in the planning division. She said:

"Even I do not work in the field directly, I have to plan the fisheries development, including aquaculture, in all regions in Indonesia. With the knowledge and skills I got from the course, I can do more detail and correction in planning the aquaculture sites."

A trainee from the Inland Fisheries Division of Sri Lanka was sent to Tigbauan to prepare him for a higher post at home. He became Director of Inland Fisheries with a staff of 500 under him. Aside from upgrading his knowledge of aquaculture, he found his association and exchange of information with other participants useful and enriching. Part of his duties were to supervise the cage/pen culture programs project funded by AFNS/FI.

A Thai from Samuthsakorn Fisheries Station is now supervisor of research projects in his station. As a result of being promoted one level higher, he now supervises more staff members (from 5 before training to 20 at present).

Another trainee's designation at BFAR's main office is "supervising fishery biologist." Shortly after she earned her M.Aq. degree, she was assigned as project coordinator for priority projects on fish propagation in three places in Luzon. Today she is project leader for a series of studies on coastal resources management funded by ASEAN-USAID. She said her training "increased my self-confidence and broadened my understanding about other people. What impressed me is the site specificity of aquaculture after seeing adaptations in many places we visited."

Two AQD staff members who took part in the M.Aq. course are now in the training division of AQD. One is a training officer in charge of coordinating planning and course preparation, including scheduling and requirements of the popular prawn hatchery/nursery operations. She also used her knowledge from

the course in her lectures to participants. After she earned her degree, she was upgraded to research associate level. Her colleague was assigned to plan and implement the Brackishwater Pond Culture course. The job included supervision of trainees and moderating discussions after a lecture or field visit. He was also upgraded to research associate. His wish was that AQD staff assigned to the training division would be encouraged to do research on the side.

Another trainee utilized the knowledge she gained as an instructor in fisheries at CLSU. She was also a study leader of a research project on tilapia genetics. According to her, "before I was reluctant to submit proposals, now I feel more confident to prepare and submit proposals as well as to handle lecture class."

At BFAR, another trainee worked as a fishery biologist. She listed the topics she learned but she found some of them to be of limited use because of her specific assignment in brackishwater aquaculture.

From RLCC, a trainee also listed many topics he learned from the M.Aq. course. He was able to utilize only the freshwater aspects of the course and not the marine and brackishwater components because Wuxi is exclusively a freshwater station. In addition to the knowledge and skills he gained, Miao said he could "easily exchange ideas with foreign trainees in RLCC on subjects related to aquaculture." He received a salary increase and was promoted to research associate.

A Deputy Regional Director of Fisheries in Maharashtra State wrote to say that the most valuable knowledge he learned was "technique of project formulation, planning and relevant study of socio-economics."

> I have applied my knowledge in the project to construct national fish seed production farms. The training has changed my attitude in field work. Although I was not given any reward

> or incentive since my return, I am concentrating on fish seed production farm management and socio-economic development of farmers.

The one-time offering of "Aquaculture for Social Scientists" was an attempt to link more directly the programs of two trainer institutions: UPM and AQD. AFNS/AEP, AFNS/FI, and FAD thought it would be enriching and valuable for social scientists (especially fisheries economists) to be exposed to the technical aspects and technology of aquaculture. The testimonies of the questionnaire respondents seemed to support the value of this initiative.

An economist from the Department of Fisheries of Thailand said:

> "The training help me in developing various techniques in order to study the cost of aquaculture production, especially to calculate exactly the cost of production. I am to do a research about economic analysis of aquaculture and I hope the results can be used for planning, development, and extension of aquaculture."

Another Thai of the Department of Agricultural Economics, Kasetsart University, found his knowledge of fresh and brackishwater fish in the economic analysis of green mussel culture systems in Thailand useful. He was a member of the Kasetsart research team under the AFSSRN program. This research is entitled "Economic Performance of Small-Scale Freshwater Agriculture-Aquaculture Farming Systems in Northeastern Thailand."

One trainee is a UPM lecturer in the M.Sc. fisheries economics program. Aside from using his knowledge from training in his lectures, he had undertaken two studies after returning from the course: "Economics of the Fry

and Fingerling Industry in Malaysia" and "Economics of Integrated Agriculture-Aquaculture Farms in Malaysia." The exposure to aquaculture had also helped him to understand the importance of interdisciplinary research and to "work closer with fisheries scientists and to understand their objectives and perspectives in fisheries and aquaculture research."

A trainee from AQD resigned 2 months after the training to put up his own prawn hatchery. He "saw that there was gold mine in prawn hatchery." A trainee who is now head of the Visitor's Service Office, was also from ADQ. She felt the course gave her confidence in briefing and guiding visitors interested in AQD's research and training program. "I have become conversant with research terminologies and technologies transferred by the Department."

Problems and Needs

Organizational Problems. In the review of its 13 years of existence, AQD pointed to its ambiguous organizational character as the root cause of most of its problems. Although created to be a regional or international organization, it had been depending for 80% of its operating budget on the Philippine government. The Philippine government asserted its control on AQD programs, budget, and operations. The following examples illustrate the specific inhibiting factors that affected AQD's operation as a research institution.

(1). AQD is subject to Philippine labor laws. As such, services of casual and contractual workers hired during peak loads cannot be terminated if they have worked there for more than a year. Moves to dispense with such services had generated labor unrest.

(2). ADQ had a tendency to be politicized. Because AQD has to lobby for its budget, some pressure can be expected from politicians in appointment of some staff.

(3). There was a lack of continuity and stability in the tenure of the chief. The 2-year term of the Chief of AQD has led to frequent fierce infighting for this coveted post. These factors have resulted in the chief spending half of his time in Manila and the other half in the field stations. Also, changes in key personnel and program thrust had occurred several times. For example, in 1979 a new chief changed the key officials in administration and reorganized the research program into mariculture, brackishwater culture, and freshwater culture. The following year the chief resigned and a deputy chief was appointed and proposed a new program of three divisions: administration, research training, and extension. In 1983, another new chief came and reorganized the leadership structure and emphasized the commodity (production) approach in the management of AQD research and extension programs.

(4). There was poor cooperation between research and training staff. It had been difficult to get the researchers to conduct lectures and practicum in the training courses. Their main interests were in the production of research papers upon which monetary rewards, promotions, and future careers rested. Lecturing in the training course was not given credit in the overall performance rating until about 2 years ago when the honoraria incentive was instituted. Still the participation of researchers in training was far from "enthusiastic".

The Future of the Training Courses. After the termination of FAD's formal support to the four training courses, AQD continued to offer at least two of them on a regular basis: Brackishwater Pond Culture and Hatchery of Marine Finfishes. AQD's training division head said that there is a strong demand for the brackishwater training course. The demand for the hatchery of marine finfishes course is weak, but AQD has kept it because of its strong research component. Freshwater Aquaculture was discontinued because China is a better place for this. The bivalves course was also stopped because there was no adequate staff to handle the course. New courses were offered starting in 1988: Artemia culture (funded by the Belgians) and fish health management. AQD's prawn hatchery/nursery operations course continues to be popular because of current excitement regarding prawn culture for export.

Needs. As in RLCC, the important need expressed by AQD's training staff is upgrading their planning and management skills. They would like to prepare and implement their training program professionally, including its A-V component. There are five full time staff of the training and extension division including the director. Although the expressed need of upgrading is valid, the problem of capability development in a research/training institution is complicated by the practice of converting researchers to trainers. The researchers turned "full-time" trainers cannot completely detach themselves from doing research because trainers receive little professional recognition and reward. Thus, staff retention is low in training departments of many research institutions.

Another need expressed is the replacement of their obsolete A-V equipment. For example, they need a multi-system video machine.

Summary

The SEAFDEC Aquaculture Department (AQD) is one of the three departments of the Southeast Asian Fisheries Development Centre (SEAFDEC). SEAFDEC is a research and development organization designed to accelerate aquaculture technology development in the region.

The AQD in the Philippines had been receiving substantial financial support for research (mainly milkfish breeding) from AFNS/FI since 1975. Significant breakthroughs in fish breeding technology resulted from this research. It was then decided to disseminate these important techniques through training both nationally and regionally.

FAD responded to this dissemination strategy in 1984 by providing a 3-year support to four short-term courses, ranging from 1 to 2 months' duration. FAD also funded some participants to the M.Aq. course for senior aquaculturists. This course was a SEAFDEC/AQD-NACA-UPV collaborative program. In addition, a 1-month course in "Aquaculture for Social Scientists" was offered once in 1986.

The feedback from former trainees in the various courses indicated significant success in the application of the various technologies (especially breeding and production techniques) learned from the AQD courses. In the M.Aq. course, several of the graduates occupied key administrative and supervisory positions upon their return. The course on "Hatchery of Marine Finfish" had considerable impact on the National Bangus (milkfish) Breeding Program of the Philippines. Most of the 14 trainees who took the course now occupy key positions in several national and regional breeding stations of the Bureau of Fisheries and Aquatic Resources (BFAR).

AQD will remain an important regional institution in aquaculture research and training. AFNS/FI continues to provide research support. Because of its key role in technology development and dissemination, FAD should have a continuing presence in AQD's training program, which is striving to be self-reliant. The expressed needs where FAD can help are in staff upgrading, instructional materials and A-V equipment improvement.

Case 4: National Inland Fisheries Institute (NIFI),
Department of Fisheries,
Ministry of Agriculture and Cooperatives,
Bangkok, Thailand

Background

NIFI is one of the most important trainee institutions receiving IDRC support for fisheries in Thailand. The institute was organized in 1975 to specialize in inland (freshwater) fisheries research and is located on the campus of Kasetsart University. It is a model of inter-government, inter-donor, and intra-institutional cooperation in fisheries research, training, and extension. Funding to establish the Institute was shared by the governments of Thailand and Canada (the Canadian International Development Agency, CIDA). IDRC, NACA, and other donors support NIFI's research and

training projects, and its technical staff (e.g., biologists) serve as special lecturers on fish culture at the Faculty of Fisheries at Kasetsart University. Moreover, the Institute's staff work closely with colleagues in 16 field stations and the Ubol Ratana Reservoir, which are operated by the government's Inland Fisheries Division.

IDRC's support to NIFI goes to research and training of its staff.

Trainee Institution

As in the trainer institution, FAD's selective criteria apply to a trainee institution: adequate infrastructure, research manpower capability, and a research program within an IDRC division's area of interest. As a specialized national institution for fisheries, NIFI qualifies very well under these criteria.

Infrastructure and Manpower. NIFI has its own administrative building and laboratories. Its facilities include modern wet and dry laboratories fully equipped for specialized studies on water pollution and fish diseases. There are also extensive aquarium and fish culture facilities, including 12 earth and 66 concrete ponds with an area of 1400 sq.m. to hold broodstock and young fish of different species used for research and for studying natural waters and commercial fish ponds.

There are currently 39 biologists, 36 fisheries officials, and a large support staff and temporary workers assigned to 10 organizational units of the Institute.

Research Program. The program is divided into topical areas and each one is an organizational unit. The fish biology unit examines the life history and describes the condition, reproduction, age, growth, and mortality of important freshwater fisheries. AFNS/FI has a long-term research support in this area of fish genetics. The ecology unit provides information about fish food supplies, influence of predators and competitors, and principal

ecosystems of species succession. To provide information on distribution and size, mortality rates of selected stocks are the responsibility of the fish population unit. One of AFNS/FI's recent research interest and support in NIFI is with this unit. The fish population unit also develops ways and means of detecting, identifying, preventing, and eradicating fish diseases and parasites, particularly in hatcheries and fish farms. In addition, the unit provides diagnostic and consultative service for government and private fish production facilities.

Other units under the Institute's program are fisheries management, water pollution, aquaculture techniques, fish nutrition, taxonomy, and extension.

Process of Support

FAD support of NIFI staff for training has been mainly upon the recommendation of AFNS/FI. For example, Somsak Luanprida completed the M.Aq. degree in the Philippines under a PRA arrangement. Another staff member was sent to the 6-week course on Carp Seed Production at RLCC under the group training mechanism. Two staff members funded under PRA went to the Fish Genetics training program at the National University of Singapore. Still another staff member went to a 1-month course at SEAFDEC-AQD on Freshwater Aquaculture within FAD's institutional support to SEAFDEC-AQD.

Impact

All the FAD-funded staff members of NIFI are still connected with the Institute. Practchai Veerasit who went to the Carp Production course has been assigned to the Aquaculture Technique unit. He handles research on the control of hormones in breeding of various species of carps (Chinese, Indian, Thai) and catfish. Supattra Uraiwan attended the Fish Genetics training at NUS and did research on growth and size selection of tilapia. She is now on leave for a Ph.D. degree training in Canada under an IDRC in-project support.

Supattra's colleague, Parnsri Jarimopas, who also was in the NUS Fish Genetics program, is doing research on tilapia and catfish selection. Boonyarut Chantsarang, heads the fish population unit and is in charge of national water management and surveys of fish in reservoirs. She attended the Freshwater Aquaculture course at SEAFDEC-AQD. Pratchai Veerasit, who went to the Carp Seed Production workshop in China, does research on induced spawning and breeding of various carp species.

A trainee who earned his M.Aq. degree from the UPV-SEAFDEC/AQD program describes how he applied his training upon his return to NIFI:

> "My knowledge and experience in aquaculture are both in theory and practice. After the study tour in India and China, I knew and understood the fisheries program of my neighbors. After returning to my institute, I set up the working program of my section. I also advise my staffs and friends how to plan fisheries research projects including helping them solve their problems. The training has changed my ability to work a little because my responsibility is the same but my decision is excellent. My home institution has not given importance of the training. My position is not upgraded. I would assess the significance of my project on my institution's research program from the farmers' agreement. If they can use the knowhow which is the result from the research work, the project is successful."

Summary

NIFI is Thailand's major national research and development institution in inland fisheries. It serves 16 inland fisheries stations in various parts of the country through projects and training. NIFI is part of a network of fisheries research institutions supported by AFNS/FI.

FAD provided awards to enable NIFI staff to attend various courses in trainer institutions. All FAD-supported trainees and the courses they attended were recommended by AFNS/FI. This resulted in a good match between the area of training and the trainees' activity/assignment after training. NIFI is an ideal trainee institution within the T-T scheme because it is devoted to a specific focus (inland fisheries) and AFNS/FI's tie-up is closely linked to the institution's research program.

Case 5: Bureau of Fisheries and Aquatic Resources (BFAR), Department of Agriculture, the Philippines

Background

BFAR is a major trainee institution because of its country-wide National Bangus (milkfish) Breeding Program (NBBP). This program was spawned by an important research breakthrough at SEAFDEC-AQD in breeding techniques of captive milkfish. The research had been supported by AFNS/FI for many years.

Milkfish is considered an important staple food in the Philippines. It is cultured extensively in 195,000 hectares of freshwater ponds and 30,000 hectares of freshwater fishpens. To meet the need of a stable and increased supply of milkfish fry through SEAFDEC-AQD's hatchery production technology,

AFNS/FI provided a 3-year funding to four (regions I, III, VII, and XI) of the 13 regional programs of BFAR.

As a government agency responsible for the development, improvement, management, and consumption of the country's fisheries and aquatic resources, BFAR needed a lot of trained technicians to work in its offices and laboratories in 13 regions of the Philippines. SEAFDEC-AQD's course on Hatchery of Marine Finfish became an appropriate vehicle to train BFAR's staff. Fourteen BFAR scientists took this training in 1985 and 1986 supported by FAD's project funding in AQD.

Impact

The 14 BFAR staff who attended the Hatchery of Marine Finfish course were from the main office in Manila and the regional offices receiving support from IDRC. Of this group, five responded to the FAD questionnaire.

The overall coordinator of BFAR's National Bangus Breeding Program said that the knowledge of finfish hatchery management, curing water hardness from tap water sources, and retaining pure algal culture were just a few of the techniques that he had applied and prescribed in field implementation of the NBBP. He added:

> "Equipped with the basic technical knowledge acquired from training, confidence has developed in my dealings with field technical staff on NBBP project activities."

One trainee has been assigned to Region VII NBBP project. He provided a long list of knowledge and skills he learned and how he had applied them in broodstock spawning in his hatchery. He said:

> "The training has changed a lot of my ability to work, my habits and my methods

> and techniques of project implementation. Being a government employee and not knowing the real operation of a research project, I used to report to office following standard government time. But after my training I realized that time element, diligent work and resourcefulness are very important in a research project. I learned to work without thinking of time and expecting any overtime pay especially at night in monitoring the spawning activities. I was given full support in the project through additional personnel, additional funding, immediate action on papers of the project and recognition."

One trainee stationed in BFRA's Region XI (Mindanao) found the training very enlightening.

> "The training opened my eyes to the value of research. It's only in that training that I experienced and observed how an egg hatch, conducted hormone injection of spawners, egg counting for fecundity estimation, collection and larval rearing. Also the culture of natural food. All the skills and knowledge learned was applied in our work. But as to recognition, reward, and incentives, the office does not value the training attended by their employees."

Another trainee is in BFAR's Region I NBBP project. He was delayed in the application of his training skills because "only this last year 1987 have

funds been made to construct small scale milkfish hatchery. I've revised some plans I learned from training on hatchery construction."

Summary

Like NIFI, BFAR is an important national research and development arm of the Philippine government in fisheries. BFAR has linkage with fisheries stations in all 12 regions of the country. It is also a part of the research network of fisheries institutions supported by AFNS/FI.

FAD's investment in BFAR was primarily to support a major research project funded by AFNS/FI -- the National Bangus (milkfish) Breeding Program (NBBP). Fourteen BFAR staff took the SEAFDEC-AQD course on Hatchery of Marine Finfish. Most of these trained personnel now hold key positions in several regional stations. Again, like NIFI, BFAR fits well in the T-T scheme because it has a large national project (funded by AFNS/FI) that is related to an earlier AFNS/FI research support in bangus breeding.

APPENDIX C

Bibliography

Publications

Graduate Studies Brochure, Universiti Pertanian Malaysia, 1986/1987

Faculty of Economics and Management, Universiti Pertanian Malaysia, 1988

Selected Papers of Freshwater Fisheries Research Center, Wuxi, China, 1987

China Fishery, Bureau of Aquatic Products, MAAF, 1987

Freshwater Fisheries Research Center of the Chinese Academy of Fisheries Sciences, 1987

NACA Newsletter, January 1988

National Inland Fisheries Institute, Bangkok, Thailand, Department of Fisheries, Ministry of Agriculture and Cooperative, 1977

Universiti Pertanian Malaysia, Fisheries Economics Graduate Student Fellowships, 1988/89 - 1989/90

Asian-Pacific Regional Research and Training Centre for Integrated Fish Farming, Wuxi, Jiangsu Province, China

The Bureau of Fisheries and Aquatic Resources, Ministry of Agriculture and Natural Resources, 1983

Bangus Breeding (Philippines) Annual Report, Bureau of Fisheries and Aquatic Resources, May 1987

NACA-ICLARM Quarterly, July 1987 (The Asian Fish Health Network, by J. Richard Arthur)

Aquaculture Department: A Review of the Years 1973-1985 SEAFDEC-AQD, October 1986

Aquaculture Training Program (brochure), SEAFDEC-AQD, 1988

Reports

Study Reports

Flores, P. Training Programme in Asia: An Evaluative Study, August 1983

Flores, P. FAD Training in Asia-Pacific Region, 1982-84: An Evaluative Study

Flores, P. and Tan, June. The Selective Trainer-Trainee Scheme in ASRO: A Status Report, June, 1984.

Torres, Pastor. Review of the Graduate Fellowships Project, UPM Faculty of Resource Economics and Management, October 6, 1986.

Chua, Thia-Eng. Aquaculture Training Needs in Developing Asia, 1986. IDRC Manuscript Report 145e.

P. V. Flores Trip Reports

TR No. 4/82/FP, Kasetsart, NACA, Dept. of Agricultural Extension, October 18-23, 1982

TR No. 6/82/FP, NACA Second Advisory Committee Meeting, December 12-16, 1982

TR No. 2/83/FP, RLCC, February 21, 1983

TR No. 3/83/(B), Universiti Pertanian Malaysia, August 3, 1983

TR No. 2/84, SEAFDEC-AQD, March 8, 1984

TR No. 3/84., RLCC, April 12-17, 1984

TR No. 6/84, UPM, October 25, 1984

TR No. 5/85, RLCC, April 17-19, 1985

TR No. 6/85, SEAFDEC-AQD, Sept. 16, 1985

TR No. 2/86, Meeting of Former Awardees, Bangkok, February 26-27, 1986.

TR. No. 3/86, Workshop on Development and Improvement of Instructional materials for Training Courses, Bangkok, March 10-14, 1986

TR No 5/86, SEAFDEC-AQD, April 11-15, 1986

Project Summaries/MGC

Graduate Fisheries Economics Specialization Program-UPM (3-P-83-0321)

Memorandum of Grant Conditions, Regional Lead Centre of China (3-P-85-0107)

Memorandum of Grant Conditions, Regional Lead Centre of China (3-P-83-0230)

Memorandum of Grant Conditions, Southeast Asian Fisheries Development Center (3-P-84-0225)

Reports of Recipient Institutions

K. Kuperan, Terminal Report, Short Course in Economics for Agricultural Engineers and Food Technologists, November 17 - December 13, 1986.

Nik Mustapha, A Short Course on Economics for Fisheries and Aquaculture Scientists at UPM, May 14 - June 15, 1984

RLCC, Progress Report, December 1, 1985 - May 31, 1986

RLCC, Progress Report, June 1981 - October 1987

RLCC, Progress Report, Janaury - October 1987

RLCC, Progress Report, Seventh Training Course
April 16 - August 12, 1987